An AIR AGE Publication

MODEL
RPLANE
NEWS

ECEMBER 1946
WENTY CENTS

Serving Aviation 18 Years

MODEL AIRPLANE NEWS

JAY P. CLEVELAND
Publisher

DECEMBER 1946 VOL. XXXV No. 6

CONTENTS

Cover Design by Jo Kotula

AN AIR AGE PUBLICATION

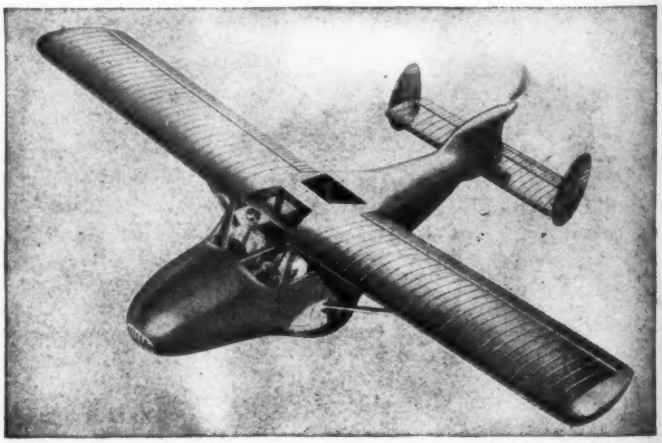
HOWARD G. McENTEE....Editor
JOSEPH M. MANN....Managing Editor
WILLIAM A. WYLAM....Associate Editor
WITTICH HOLLOWAY....Art Director
JAY P. CLEVELAND....Advertising Manager
A. M. HOFFMAN....Asst. Adv. Manager
ELY O. MERCHANT....Adv. Field Manager

Published monthly by Air Age, Inc., Mount Morris, Illinois. Editorial and Advertising offices: 551 Fifth Ave., New York 17, N.Y. Jay P. Cleveland, President and Treasurer; A. M. Hoffman, Sec'y. Entered as second class matter Dec. 6, 1934 at the post office at Mount Morris, Ill. under the act of March 3, 1879. Additional entry at New York, N.Y. Price 20c per copy. Subscriptions $2 per year in the United States and possessions; also Canada, Cuba, Mexico, Panama and South America. All other countries $2.50.

ONE of the most significant developments in the confused guided missile picture of the nation is the recent revelation of the role being played by National Advisory Committee for Aeronautics. NACA, government aeronautical research agency, is well advanced on a broad program of fundamental guided missile research but its recent announcement indicates that many answers to basic problems are not yet available. Thus, it is clear that neither the Army, Navy nor aircraft industry can have any serious plans for immediate guided missile production when data for their design is not even available yet! Obviously, many observers feel that recently announced Army and Navy plans are simply "conversation" at this point with the possibility of actual production and test of guided missiles months, or even years, off in the future.

THE NACA PROGRAM on guided missile research falls into two categories: (1) Research on problems of lift, drag, stability and control at high speeds of guided missiles; (2) use of guided missiles as test vehicles on which to mount various surfaces for study at high speeds, the results being applicable primarily to aircraft. Regarding the first category, NACA announces their facilities are now engaged to a major extent in transonic and supersonic studies, the Ames Aeronautical Laboratory at Moffett Field, Calif., being wholly engaged in high speed research. The Aircraft Engine Research Laboratory at Cleveland, Ohio, has now gone "all jet" in its research program, leaving only the Langley Memorial Aeronautical Laboratory, Langley Field, Va., engaged on vital subsonic research programs, such as helicopters, personal air-

(*Turn to page* 54)



(Above) The new Waco will look like this; has pusher prop at tail (engine in nose), simplified controls and seats four. (Below) This dual seater is the British Fairey *Firefly Trainer* with instructor seat in rear. Rolls Royce *Griffon XII* engine pulls this job along well over 300 mph

Model Airplane NEWSLETTER

by AL LEWIS

BY NOW you've undoubtedly heard all about the '46 National Model Airplane Contest. But to keep the record straight and to give credit where credit is due, we're devoting this column to some background information on the meet which should be of much interest to you.

Believe it or not, the entire meet was organized on a budget of $1,800. Now to you or me that may be a lot of money, but nowadays for a model airplane meet budget that is pretty small potatoes. The secret was the unlimited volunteer personnel who did most of the work with the result that manpower costs were not a part of the overall budget as in 1940 and 1941 (when the competition was held in Chicago with salaried employees of the Chicago Park District

doing most of the work). As a matter of fact, all the money in the world wouldn't have paid the salaries of the Kiwanis, Y.M.C.A., and Wichita model club men and women who worked on the '46 Nationals—had you tried to hire them. It was strictly for fun and the satisfaction of helping a good cause. We know, because many of them told us so themselves.

The tournament was organized in less than 10 weeks! That's how little time Al J. Hummel of the East Side (Wichita) Y.M.C.A. and James E. McClelland Jr., aircraft engineer of Beech Co., had in which to set the contest up after the earlier plans to hold it in Chicago fell through. The relatively small East Side Branch of the "Y" assumed all financial obligations; the Kiwanis club lent men and backing; but it was the Y.M.C.A. (fortunate in having as its executive secretary genial Al Hummel) which stuck its neck 'way out. Main theme of entire competition was to provide plenty of facilities for an unlimited number of entrants. This meant mailing out over 6,000 entry blanks and 3,000 information bulletins in addition to arranging for housing facilities for any number of possible participants up to 2,000! Gentlemen, that's real work!

Sometimes we wonder what there is to this model aviation game that makes folks want to shoulder such a load. We've seen it many, many times—people anxious to take on added responsibilities and work just to give the model builder a break and a contest. It's a wonderful hobby-sport, no doubt about it!

So much for meet background, here are a few highlights which you may have missed.

Do you know that one contestant actually rode to the contest on mule back? That's the truth. One colored entrant from Oklahoma clomped his way into

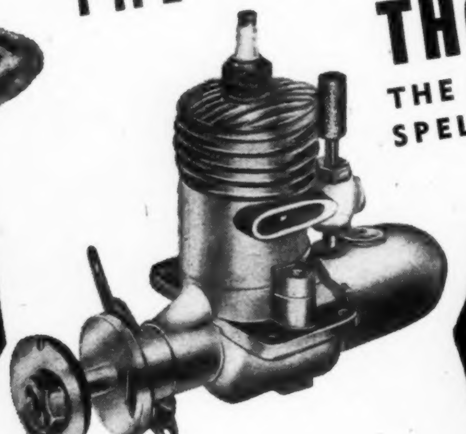
(*Turn to page* 90)

BANTAM SWEEPS THE NATIONALS!
FIRST place in the Junior Free-Flight Class "A" event.
FIRST place in the Senior Free-Flight Class "A" event.
FIRST place in the Junior Control line Class "A" event.
FIRST place in the Senior Control line Class "A" event.
BANTAM MAKES A GRAND SLAM AT THE NATIONALS!
For the first time in gas model history every event in the class was won by the same motor—the sensational Bantam! No wonder the new Bantam is the talk of the model industry. No wonder too that it's the most wanted motor in the field. What other motor can equal this record? National Champion Class "A" 1939, 1940, 1941 and through the war years . . . and now a clean sweep of the 1946 Nationals!
Yes – BANTAM IS ENGINEERED FOR CHAMPIONS
$18.50 less coil and condenser
At Your DEALER'S NOW
BANTAM PRODUCTS INC.
Manufacturers of Miniature Gasoline Engines for Model Aircraft and Outboard Motors
51 CHAMBERS STREET, NEW YORK 7, N. Y.
PLANT: CLIFTON, NEW JERSEY, U. S. A.

THE MIGHTY, NEW

THOR "B"

THE ENGINE THAT SPELLS P-O-W-E-R



FACTORY TESTED READY TO RUN

ONLY $9.95

Complete with coil, condenser and fully illustrated instructions.

in KIT form

Fully machined, 5 minutes to assemble -

ONLY $6.95

Without coil and condenser

WITH FULL INSTRUCTIONS

TESTIMONIALS

Just a few of the many hundreds received from satisfied THOR users.

"I am an owner of one of your Thor engines. I think it is a good engine and have gotten many successful flights out of it. The last one was a 2½ mile, 1 hour 50 min. flight which was beautiful."
B. B., Midland, Texas.

"I also want you to know I am very pleased with the Thor engine I recently ordered from you. I'm amazed by the compression that is found in a motor as inexpensive as yours."
B. W., Ann Arbor, Mich.

"I received my Thor engine and am very much pleased with it."
F. G., Clinton, Okla.

"I have really enjoyed my Thor since I have had it."
E. W., Orlando, Fla.

"Have received my Thor engine and am well pleased with it."
E. C., Norfolk, Va.

"I am really surprised and pleased with my Thor engine. It is really of fine workmanship and materials."
D. J., Sanford, Fla.

"A friend of mine received a motor from you the other day and it runs perfect. Please send me one right away."
R. C., Vestel, N.Y.

"I like the engine very well and it runs good."
S. S., Nashville, Tenn.

"I have gotten very satisfactory performance from your Thor."
G. B., San Rafael, Calif.

"I like the even and steady way it runs much better than several other motors I have owned. It also seems to have plenty of soup for its size."
E. L., Warm Springs, Mont.

"We are in receipt of the two Thor engines we ordered from you recently and are very well pleased with this motor and are enclosing our check for 4 more of these engines."
S. S., Pampa, Texas.

"I am a pleased and satisfied owner of one of your Thor gasoline engines.
S. W., Rutledge, Pa.

"After seeing one of the Thor engines run which was owned by one of my buddies, I reached a conclusion that it was a superior engine for the listed price."
W. F., Del. Co., Pa.

"I am a proud owner of your Thor engine and it runs with clockwork precision."
A. L., Long Beach, N.Y.

"The first ½ dozen were great so now ship me with haste 4 dozen more."
H. H., Omaha, Nebr.

"I am very pleased with my Thor engine."
B. R., Middlesboro, Ky.

"I am very pleased with your engine and hope to have it in a contest in the near future."
A. L., Long Beach, N.Y.

"Have had this engine for about one week now and am having excellent results with it."
O. W., Gulfport, Miss.

AMERICA'S HOBBY CENTER, INC.

THOR—The Engine that won't be beat in any price field.

The Ideal Engine for all models, planes, boats and race cars!

Just a "twist of the wrist," and she's off—smooth, velveted power. Never lets you down!

➔ This is your engine — powerful, smooth, streamlined. Featuring the newest technical developments in the model engine field. Just a "twist of the wrist" and the Thor starts with a roar. It's as simple as all that!

OVER 20,000 THORS

have been sold this year

SPECIFICATIONS

H.P.: 1/6	Displacement: .29
Bore: 13/16	R.P.M.: 300-11,000
Stroke: 9/16	Weight: 4½ oz.

Class B, NAA RULES

Jobbers: Write for attractive discounts

Dealers: If your jobber does not have THOR in stock, order direct

IMMEDIATE DELIVERIES

PLUS THESE EXTRA ADVANTAGES:

- Ideal for free-flight and U-Control planes, boats and midget cars
- Complete fully illustrated instruction manuals
- Full 30 day guarantee against defective parts
- Easy to start, "a twist of the wrist"
- High compression ratio for instant starting
- Steady and consistent running
- Automatic carburetor for quick break-in
- Invertible and runs in either direction
- Every part precision engineered to perfection
- Lowest weight of all "B" engines without sacrifice of power
- Streamlined for cooler and longer operation
- New intake design for non-flooding and positive adjustment
- Piston, cylinder and bearing surfaces micro-precision fitted to .0001"
- Crankshaft of polished-ground steel, scientifically balanced. Extra long
- Special oil grooves for longer life
- 1" bearing surface with forced double lubrication for longer wear
- Uniflow piston
- Integral all-metal tank
- Castings made of new "THOR" alloy. With more heat dissipation and wearing quality than any other engine
- Perma-designed foolproof timer—never needs adjustment—can't slip in operation. Made of Beryllium
- Replacement parts available and interchangeable

And every engine has the new PRESTO disc starter for quick, easy starting

Only our large volume and tremendous production make it possible to give you so much value for so little.

SEND ONLY $1.—We Will Ship Your Engine Collect C.O.D. the Same Day; or Send Full Price Plus 25c Extra and We Ship Parcel Post Insured.

(Thor Engines Division) Dept. M126T 156 West 22nd Street, New York 11, New York

Send self-addressed, stamped envelope for FREE illustrated booklet


The Perfect Gift for YOU!
GENIE TOOL
IT'S MAGIC
AT YOUR FINGERTIPS!
IT NOTCHES!
IT PUNCHES!
IT DRILLS!
Yes, GENIE TOOL is certainly the perfect Christmas Gift to give, or receive, this year. It's the only precision hand-tool on the market today that NOTCHES—FILES — GOUGES — CHISELS—DRILLS and CARVES... Truly the Model Builders favorite ALL-PURPOSE Cutting Tool...
IT SAWS!
IT GOUGES!
IT CARVES!
HERE'S THE SET MODEL BUILDERS, COAST TO COAST, ARE BUYING!
Set #95—Includes one each of GENIE TOOL ejector-type handle—1/16" "Notch Knife" with ejector—Right-angle "V" Blade—1/16" Drill Chuck—Razor-thin Outlining Blade—3/32" Radius Gouge—3/16" Diameter Hole Punch—1/8" Wide "Notch-Knife"—1-1/2" Long fine-cut Saw—Heavy duty blade—3/16" wide Flat Chisel—3/32" wide Flat Chisel—1/8" Radius Gouge—3/32" Gouge with Side-Cutting Edge. Boxed in Attractive Lacquered Wood Chest.
There's a GENIE TOOL Accessory for every use!
SEND FOR CATALOG TODAY!
JOBBERS—DEALERS—MODEL BUILDERS—WRITE DIRECTLY TO
Dept. L, MODEL TOOLS—BOX 30—BURBANK, CALIF.

WEST COAST TIPS

By JOHNNY DAVIS

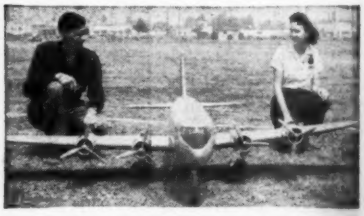
WELL, the month of August and the Labor Day weekend are over but boy, oh boy, how we managed to make it is beyond us. What with the Western Open at Los Angeles and the Nationals at Wichita, excitment was certainly at fever pitch and sleep was something you heard about but somehow never got any!

First we will tell you of the happenings and results of the Western Open, followed by notes on the Nationals.

Los Angeles was in a great dither on August 23-24-25-26 as any town would be that had 1500 model enthusiasts all over the place. Headquarters for the flying circus was Dorsey High School Gymnasium, a large edifice seemingly austere enough on the outside during the days of the activities, but at night the old gym pulled a Doctor Jekyll and Mr. Hyde act—mattresses sprouted all over the floors and the interior of the gym became the scene of the most hotly contested event of the day—indoor rubber catapult gliders a la Jim Walker!

Some fiend in human form had unwittingly or on purpose left close at hand, to the unsuspecting Oakland lads who were using thd gym for sleeping purposes, a large supply of these infernal machines and at night they came to life, forever robbing the Oakland boys of their sleep for the night with such famous last words as, "Aw, pull it back farther, the rubber won't break!"—or, "Here, let me throw this basketball at it, that'll knock it loose from the girder!"—or, "Aw, for blankety blank's sake, fellers, let's go to sleep!" ringing through the gym into the wee hours.

However, during the day the gym was inhabited by the hard working crew from the Junior Chamber of Commerce, putting on their first model plane contest—the largest in numbers and in wonderful prizes that it has ever been our privilege to see, and more power to Warren Snyder and his boys at the JC for their efforts next year.



Mr. & Mrs. Eddie Shietzefelt with their exact scale model of the *Los Angeles*. This four motor control liner unfortunately crashed during flight

A tragedy occurred when Eddie Shietzefelt's beautiful 12 ft. DC-4 crashed headlong into the ground from an altitude of 20 ft. Eddie's ship was powered by 4 *Super Cyclones* and for a control line model was really something out of this world. The fuselage was almost big enough to accommodate a man or small boy, and with all 4 *Cyclones* roaring it made an awe-inspiring picture. However, in the air it appeared unstable, either due to the gusty wind or the fact that Eddie flew it on 70 ft. lines, comparatively short for such a big ship. Anyhow, after making about one and a half circuits with Eddie fighting it all the way, the big ship finally nosed down and crashed straight below. Result of the crash was that forward compartments of the fuselage back to the wing leading edge were completely demolished, the right inboard motor housing and mount were damaged, and the left main gear was damaged slightly.

All the control line events were held at Rancho Cienega, the free flight and outdoor rubber events at Western and Rosecrans, R.O.W. at the Sloughs at 190th and Main, and the indoor events at Los Angeles Armory.

Largest entry was in the free flight events which, however, were handicapped by the wind that always comes up at Western and Rosecrans around noon and lasts the rest of the day. We watched a beautiful *Zipper*, painted a bright orange, that seemed a sure winner. The contestant was very businesslike and started his engine without any fuss, adjusted it quickly and launched it perfectly. For a moment the little plane went up under perfect control, then suddenly a gust took it and over it went straight into the ground, power on . . Toothpicks!

It is our firm belief that the area south of Los Angeles is not suited for free flight aircraft because of this high velocity wind which always comes off the Pacific in the afternoon. It seems to us that someone should take the initiative and lead the free flighters inward to some of the flat areas east and north of Los Angeles.

(Turn to page 12)

West Coast Tips

(*Continued from page* 10)

Following are complete results of the meet:

Control Line Speed

Open.—Class A—1. Les McBrayer, 91.04 2. Norm Morgan, 90.77 3. Don Miller, 86.29

Class B—1. Don Newberger, 108.95 2. Keith Storey, 98.85 3. Tony Naccarato, 97.87

Class C—1. Don Newberger, 128.38 2. Clarence Wallick, 123.71 3. Marshall Axcell, 118.65

Junior Speed (All Classes)—1. Ray Benskin, 99.44 2. Buzz MacKerracher, 87.37

Control Line Precision (Open)—1. J. C. Yates 2. Roy Mayes 3. Jack Sumner

Control Line Precision (Jr.)—1. Davis Slagle 2. Jack Gilroy 3. Richard Tejida

Control Line Flying Scale—1. Cedric Galloway 2. J. C. Yates 3. W. K. Parke

Control Line Team Stunt—1. "The Hatchetmen" 2. "Montebello Model Manglers" 3. Bob Palmer & J. C. Yates

Radio Control—1. Elbert Joe Weathers

Rubber Powered Events Indoor

Stick Indoor Open—1. Bill Atwood, 11:59.4 2. Stuart G. Bennett, 10:41.3 3. Frank Cummings, 10:26.7

Stick Indoor Junior—1. Richard Emery, 0.15.8 2. Thaddeus Taft, 0:10.0

Cabin Indoor Open—1. Bill Atwood, 10:30.6 2. Frank Cummings, 9:56 3. Ted Just, 9:05

Rubber Powered Events Outdoor

Stick Outdoor Open—1. Frank Cummings, 11:57.2 2. Leland Spaulding, 9:09 3. Ted Gillette, 8:43.4

Cabin Outdoor Open—1. Robert Swain, 13:36.5 2. Frank Cummings, 10:58.8 3. Bill Tharpe, 8:13.2

Stick Outdoor Junior—1. Thaddeus Taft, 2:15.8 2. Emery Richards, :48

Cabin Outdoor Junior—1. Thaddeus Taft, 1:47.3 2. Barre Bodenlos, 1:06.5 3. John Sims, :58

Outdoor Glider Events

Hand Launched Open—1. Bill Lane, 4:52 2. Bob Hanford, 4:01 3. Cedric Galloway, 3:30

Hand Launched Junior—1. Bob Beach, 3:58 2. Barre Bodenlos, 2:12.1 3. George Beach, 1:30.6

Towline Open—1. Bill Tharpe, 12:13.2 2. Eugene Wood, 10:18.2 3. Art Wells, 9:22

Towline Junior—1. Tom Edwards, 7:13 2. Willard Wilson, 4:40.1 3. Ronnie Truelson, 3:39

Free Flight Gas Events

Class A Open—1. Bill Tharpe, 16:57 2. Ray Acord, 9:37.4 3. Ted Gillette, 9:10.8

Class A Junior—1. Martin Smith, 10:48.2 2. David Wade, 6:46.4 3. Jason Hayward, 3:22.5

Class B Open Free Flight—1. Bill Lopez, 14:24.2 2. Allan Trainor, 13:58.5 3. Jack Dyer, 13:32.2

Class B Junior Free Flight—1. Davis Wade, 7:46.2 2. Jack Butler, 4:32.7 3. Jason Hayward, 2:51.4

Class C Free Flight Open—1. Dan North, 19:44.8 2. J. D. North, 15:25.2 3. Joe Bilgri, 14:35

Class C Free Flight Junior—1. Jason Hayward 2. Martin Smith, 12:02 3. Jack Butler, 4:52.8

R.O.W. Free Flight Gas Combined Classes

Open—1. Lew Malieu, 4:26.2 2. Frank Cummings, 2:56 3. Jack Dyer, 1:59.5

Junior—1. David Wade, 1:45.8 2. John Pearson, 1:00.1

Westerners At The Nationals

or

"The Winds Blew At Wichita—"

The control line part of the Nationals looked like a regular California meet with so many fellows from home around. Visible were Art Cummings and J. C. Yates of precision fame; Joe Kitchen and the boys from Santa Ana; Ced Galloway with his F4B4; Keith Goodwin with his Minijets (P.S.—they flew too); Louis Casale with his new aluminum planes; Davie Slagle with his airplane and engine mechanics, Mom and Pop. Over in the speed circle were Don Newberger, Clarence Wallick and Keith Storey, working like beavers. Marv Irwin was alongside with his boys from Lakewood Village. Les MacBrayer had a corner of the blanket that Newberger, Wallick and Storey were using, and Les drew interested spectators all day with his "Sidewinder A".

Some of modeldom's greats were interested onlookers, including Leon "Zoomer" Shulman, Matty Sullivan of P.D.Q. fame, and even the great Carl Goldberg who spent some time pouring over the Western "toothpicks," as they called our props.

Anyhow, Westerners, the boys made a fair impression on the fellows from "down east," and it's our bet there won't be any more screams of "towing" and "horsing," etc., when the speeds of contests out here are publicized.

Highlights and Low Points

(Two gentlemen from back east got a nice jolt in this one. This incident may not be reported exactly as happened, but substantially the story is correct.)

Speed King Newberger took his plane over for a test hop. Messrs. Shulman and Sullivan hastily possessed themselves of watches and strolled after Newberger. They languidly watched Don "hook up and start up" and take off, not wholly convinced that the boys from California were as "hot" as claimed. Five minutes later Newberger's ship came to rest near them, and they rushed over excitedly showing their watches and calculating speeds. Soon they came up

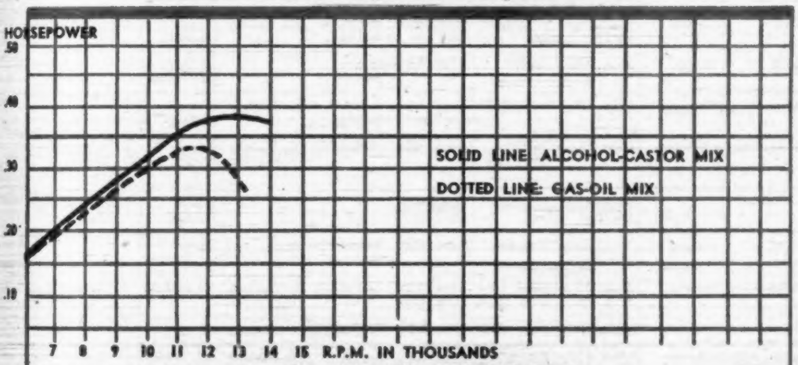
(*Turn to page* 93)

YOUR MODEL IS IN THE WINNING CIRCLE, IF AN 'OK' IS IN THE FUSELAGE!
'OK' B-29
The First, the Only Engine with "2 SPEED TIMER"
Plan your "B" campaign around the new, all new — easy-starting, consistent-running "29" . . . 2 speed timer set-up permits installation of dual set of ignition points for 2 speed operation by remote control. New, improved needle valve; Beryllium Copper Thrust Ring fitted to crankshaft! More features, many more — plus low initial cost make "29" the foundation for a memorable career in "B" flying — free flight or controline. Complete with sparkplug, bakelite tank and Neoprene fuel-line. $15.50
ALL
OK
in name
in performance
'OK' SUPER 60
With 3 position TIMER CONTROL
Super "60" — a mighty "C" power plant — features rotary valve with venturi opening over 1/3d diameter of cylinder bore; Patented porting. Oversize ball-bearing to take radial and thrust loads. Piston machined from steel (not stamped) hardened and lapped to cylinder. 3 position timer offers selective control in plane, race car or boat. Complete with spark-plug, bakelite tank and neoprene fuel line. $18.00
"OK"
Raceway-Marine "60"
"Keywayed" Crankshaft and Flywheel
"60" Raceway and Marine engines are block-tested at speeds exceeding 10,000 R.P.M. Piston precisely fitted with necessary extra clearance for top speed performance. Both crankshaft and fully, machine balanced flywheel are precision "Keywayed." Complete with spark plug, bakelite tank and Neoprene fuel-line $23.00
'OK' TWIN
With 1 Piece MONO-TYPE CONNECTING ROD
Delivers smooth, unwavering 1/2 hp despite extremely light weight (only 32 ozs.) Two opposed cylinders, simultaneous firing. Die-cast aluminum alloy crankcase, split-type. Ingenious crankshaft design for operation with mono-type (1 pc.) connecting rod. Unmatched power-to-weight ratio for largest models, radio-control and general experimentation. Complete with spark-plugs, bakelite tank and neoprene fuel line. $49.00
'OK' COIL
"OK" coil was created specifically for modern, high-compression engines Delivers hot, intense spark; high voltage with low battery drain. Woued with many thousand turns of fine, enamelled wire, vacuum impregnated with superior insulating material. Resilient, ravel-proof, plastic coated extensions. In 2 sizes for single and twin cylinder engines.
"OK" IGNITION PACKS FOR SINGLE & TWIN CYLINDER ENGINES
Consists of "OK" Coil, Condenser and highly flexible, Multi-Strand High Tension Lead. Dependable match-mate for "OK" or any miniature engines: Pack for single cylinder engine $3.00; Pack with oversize, twin-power coil for twin cylinder engines $6.00.
FREE! New "OK" Engine Brochure.
Includes hook-up diagrams, illustrations and specifications for each "OK" engine. If not available at a neighbor-dealer, write for copy direct to factory.
"Snap -to- Start"
HERKIMER TOOL & MODEL WORKS, INC. HERKIMER, NEW YORK
EXPORT OFFICE: 120 Wall St., New York 5 N. Y. Cable address (all cables) Concordia N. Y.

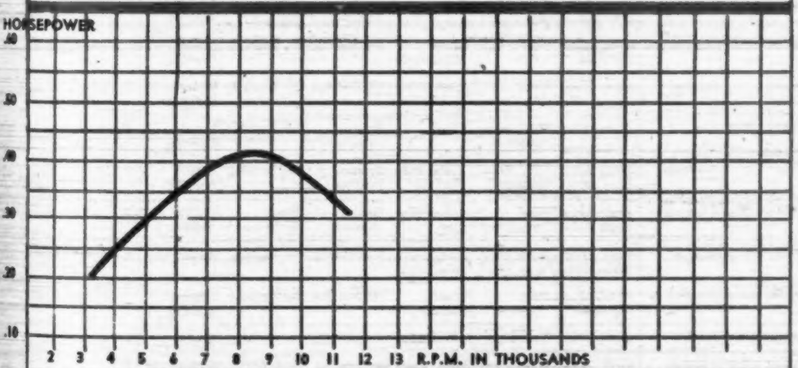
MODEL MOTOR SYMPOSIUM

This comprehensive coverage will give you a good idea of the relative features of present day motors

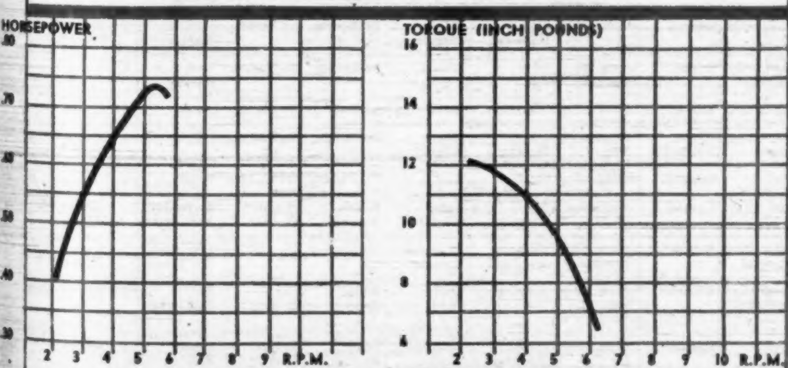
by EDWARD G. INGRAM



Power curve for *Forster 29* engine with two different fuel mixtures



Power curve for Hoof *Fleetwind* E-1 engine



Power and torque curves for the Avion *Mercury*

PRESENTED in the accompanying tables is detailed information about the construction, dimensions and performance of 51 two-cycle gasoline engines for model airplanes, produced by 39 manufacturers. Many lists of model engine data have been published, but this is believed to be the most ambitious attempt to provide extensive details about each of a large group of current models, including such features as the materials used for the component parts, available information regarding the compression ratio and maximum brake horsepower, etc.

Included in the compilation are calculated figures showing the bare engine weight in pounds per cubic inch of piston displacement, also the maximum brake horsepower per cubic inch of piston displacement and the bare engine weight per brake horsepower, in pounds, for those engines where brake horsepower was obtainable. Specific figures of this kind are of value in making consistent comparisons of engines of different displacement weight and power, but the inexperienced are cautioned against drawing unjustified conclusions from them. The worth of an engine is determined by many factors and too much importance should not be attached to unusually low weight-to-power or high power-to-displacement, even though these are desirable characteristics.

It also should be pointed out that the calculated comparative figures are based on the specifications given out by the manufacturers and there is always the possibility of errors, especially in the dynamometer testing of these very small engines. Assigned bare engine weights may be approximate in some cases. An error in engine weight of a fraction of an ounce may quite seriously affect comparisons where total weight involved is only a few ounces.

It may be well to give an idea of how engineers interpret comparative data and make use of the knowledge gained. Suppose an engine is found to be rather heavy for its displacement but unusually light for its power because of high power efficiency resulting from its ability to operate at high speed. The engineering consideration is whether the high weight-to-displacement is essential to achievement of this high power efficiency. The weight may be necessary to meet the stresses imposed by the high engine speed, or may be due to an unnecessarily heavy construction, such as a too bulky crankcase casting. In the latter case the condition can be remedied and an even lighter engine for its power obtained as a result of the analysis.

The piston displacements listed in the table are calculated from the bore and stroke of the engines, and the stroke-bore ratio of each engine is given.

Materials and construction data, but not dimensional specifications and performance data, on 17 of the engines appearing in the accompanying tables were listed in my article "Recent Model Engines," in the June 1946 issue of this magazine. The remaining engines include additional new makes and models, some that have been continued with certain changes, and a few with no changes at all.

Through the cooperation of Forster Brothers, Avion Machine & Tool Co., and Hoof Products Co., I am able to present brake hp curves of the *Forster 29*, *Avion Mercury*, and *Fleetwind* engines. These

(*Continued on page 42*)

MODEL MOTOR SYMPOSIUM

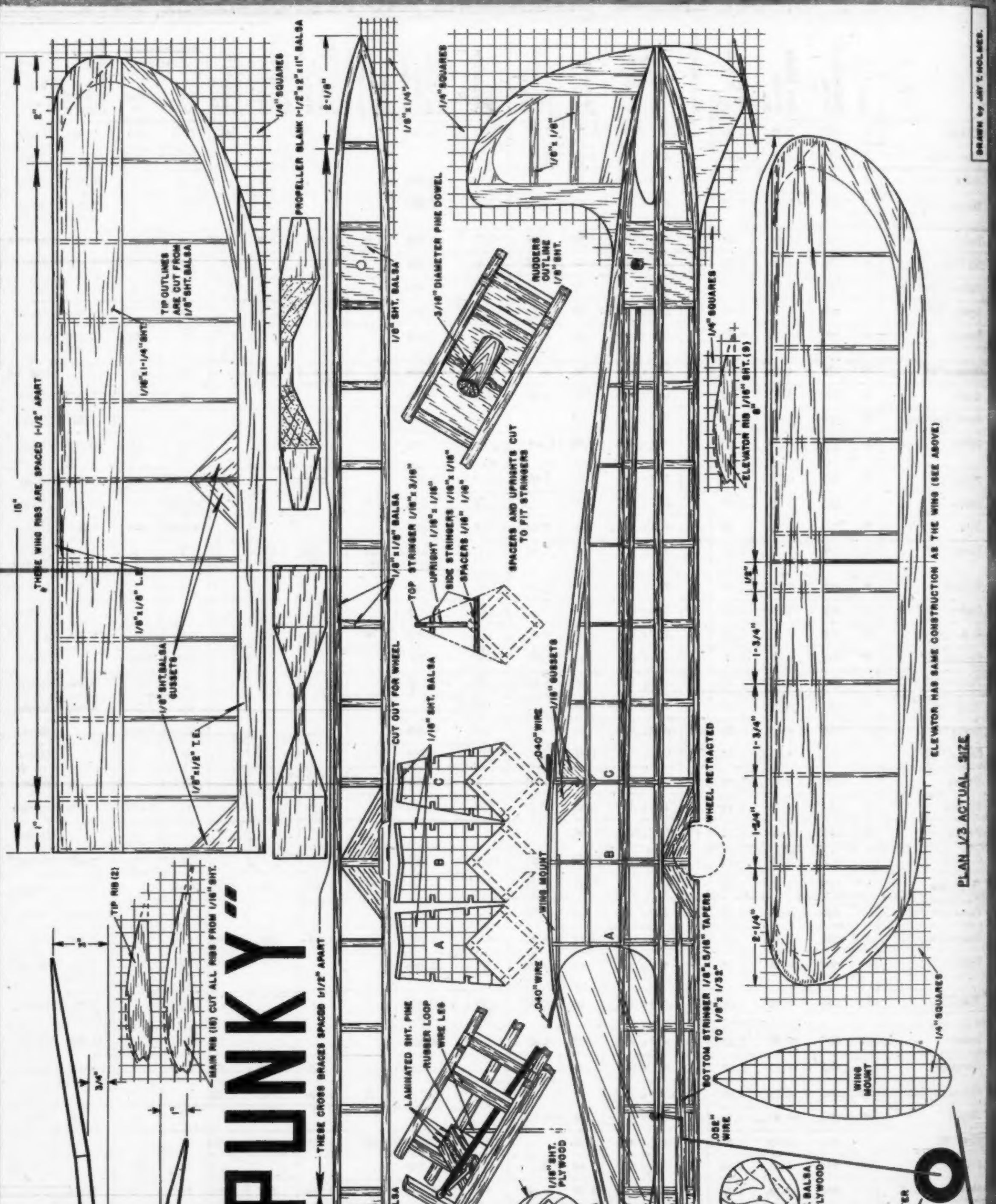
TABLE 1. MODEL ENGINE CONSTRUCTION DATA

	Class	Displacement, Cu. In.	Cylinder	Cylinder Attachment to Crankcase	Cylinder Head	Cylinder Head Attachment to Cylinder	Crankcase	Piston	Connecting Rod	Crankpin Bearing	Wristpin Bearing	Crankshaft Bearing	Number of Cyl. Ports	Crankcase Admission Valve
Elf Single	A	.097	Alum. Alloy Steel Liner	4 Screws (No Gasket)	Alum. Alloy	4 Screws (No Gasket)	Alum. Alloy	Alum. Two-piece design	Alum. Alloy, Rolled Stock	No Bushing, Bronze Strap	No Bushing	No Bushing (2-Bearings)	3	
Super Atom	A	.098	Steel, Cr. Moly.	Threaded	Alum. Alloy	Threaded	Iron, Ma.	Steel, Cr. Moly.	Steel, Hardened	No Bushing	Steel, Ball and Socket	Tool Steel Bushing	2	Rotary, Shaft Type (Piston Inlet Valve)
Arden	A	.099	Steel	Threaded	Alum. Alloy	Threaded	Magnesium, Die Cast	Steel, 1440 Cr. Moly	Steel, Cr. Moly		Steel, Ball and Socket	Bronze or Ball Bearing	2	Rotary, Shaft Type
Marvin	A	.140	Cyl. Iron, Sand Cast	Screws	Cyl. Iron, Sand Cast	Threaded	Special Alloy, Die Cast	Cyl. Iron, Sand Cast	Spec'l Alloy Perm. Mold	No Bushing	No Bushing	Oilite Bushing	4	
Perky	A	.191	Steel, Tool	Threaded	Alum. Alloy	4 Screws	Alum. Alloy Die Cast	Steel, Tool	Bronze	No Bushing	No Bushing	Bronze Bushing	2	Clapper Valve
Elf Twin	A	.195	Alum. Alloy Carbon Steel Liner	Screws (No Gasket)	Alum. Alloy	4 Screws (No Gasket)	Alum. Alloy	Alum., Two-piece design	Alum. Alloy Rolled Stock	No Bushing Bronze Strap	No Bushing	No Bushing, Ball Thrust, (2 Bear.)	3	
Ohlsson "19"	A	.197	Steel		Steel	Integral	Alum. Alloy die Cast	Steel	Alum. Alloy	Bronze Bushing		Br. Bushing Ball Thrust	3	
Husky "JV"	A	.199	Steel	Screws	Steel	Integral	Alum. Alloy 17S-T	Alum. Alloy Perm. Mold	Alum. Alloy Perm. Mold	No Bushing	No Bushing	Brass Bushing	4	
Bantam	A	.199	Steel, Mang. Moly.	2 Screws	Steel	Integral	Magnesium, Die Cast	Mechanite Iron	Magnesium, Die Cast	Mechanite Bushing	No Bushing	Bronze Bushing	2	Rotary, Disk Type
Ohlsson "23"	B	.232	Steel	Spot Weld	Steel	Integral	Alum. Alloy	Steel	Alum. Alloy	Bronze Bushing		Br. Bushing Ball Thrust	3	
Merlin	B	.232	Alum. Alloy, Steel Liner	Integral	Alum. Alloy	Threaded	Alum. Alloy	Steel, Alloy	Alum. Alloy, Die Cast	Bronze Bushing	No Bushing	Bronze Bushing	3	
Super Hurricane	B	.244	Alum. Alloy, Mechanite Iron Liner	Screws	Alum. Alloy	4 Screws	Alum. Alloy	Cast Iron, Mechanite	Alum. Alloy	No Bushing	No Bushing (Bronze Pin)	Bronze Bushing	2	Rotary, Shaft Type
Bullet	B	.276	Cast Iron	Screws			Magnesium, Die Cast	Mechanite Iron	Magnesium, Die Cast			Bronze Bushing	2	Rotary, Shaft Type
Melcraft	B	.287	Steel, Alloy	2 Screws	Steel, Alloy	Integral	Alum. Alloy, Die Cast	Gray Iron	Steel, Alloy	Bronze Bushing	Steel, (Bronze Pin)	Oilite Br. Bushing	3	
Rogers "29"	B	.292	Alum. Alloy, No Liner	Bolts	Alum. Alloy.	Integral	Alum. Alloy Perm. Mold	Alum. Alloy Perm. Mold	Alum. Alloy Perm. Mold	No Bushing	No Bushing (Bronze Pin)	No Bushing	3	Rotary, Shaft, Aux. air intake
Thor	B	.292	Alum. Alloy	Bolts	Alum. Alloy	Integral	Alum. Alloy	Alum. Alloy	Alum. Alloy	No Bushing	No Bushing		3	
Forster "29"	B	.297	Steel, Alloy	4 Screws	Alum. Alloy, Die Cast	6 Screws	Alum. Alloy, Die Cast	Steel, Alloy, Hardened	Alum. Alloy	Bronze Bushing	No Bushing	Ball Thrust and Radial	2	Rotary, Disk Type
Torpedo	B	.298	Alum. Alloy, Steel Liner	Integral	Alum. Alloy	Screws	Alum. Alloy Die Cast	Mechanite Iron	Dural	Bronze Bushing	Bronze Bushing	Bronze Bushing	2	Rotary, Shaft Type
Cannon "300"	B	.299	Alum. Alloy, Iron Liner	Integral	Alum. Alloy	Screwed on	Alum. Alloy, Die Cast	Steel	Bronze, Manganese	No Bushing	No Bushing	Bronze Bushing		Rotary, Shaft Type
O.K. "29"	B	.299	Steel	Screws	Steel	Integral	Alum. Alloy	Steel	Alum. Alloy, Forged	No Bushing	No Bushing	Bronze Bushing	2	Rotary, Shaft Type
De Long "30"	B	.300	Alum. Alloy, Mec. Liner	Cap Screws	Alum. Alloy	Screwed	Alum. Alloy	Steel, Alloy, Hardened	Dural	Bronze Bushing	No Bushing	Bronze Bushing	2	Rotary, in rear
Phantom "P30"	B	.300	Steel, Alloy	6 Screws		6 Screws	Alum. Alloy, Die Cast	Steel, Alloy, Hardened	Alum. Alloy, Die Cast	Bronze Bushing	No Bushing	Bronze Bushing	2	Rotary, Shaft Type, Square
Vivell "35"	C	.347	Steel	Screws	Alum. Alloy	4 Screws	Alum. Alloy, Perm. Mold	Steel, Unhardened	Alum. Alloy, Cast	Bronze Bushing	Brass Wrist pin	Bronze Bushing	3	Rotary, Shaft Type
Rogers "35"	C	.348	Alum. Alloy, Perm. Mold,	Bolts	Alum. Alloy	Integral	Alum. Alloy, Perm. Mold	Alum. Alloy, Perm. Mold	Alum. Alloy, Perm. Mold	No Bushing	No Bushing	No Bushing	3	Rotary, Shaft Aux. air intake
Cannon "358"	C	.359	Alum. Alloy, Iron Liner	Integral	Alum. Alloy	Screwed on	Alum. Alloy, Die Cast	Steel	Bronze Manganese	No Bushing	No Bushing	Bronze Bushing		Rotary, Shaft Type
Wensen	C	.359	Iron, Cast	Screws	Alum. Alloy	Screws	Alum. Alloy	Iron, Cast	Alum. Alloy	No Bushing	No Bushing	Bronze	3	Rotary
Elf Four	C	.389	Alum. Alloy, Carbon Steel Liner	Screws (No Gasket)	Alum. Alloy	4 Screws (No Gasket)	Alum. Alloy	Alum. Two-piece Design	Alum. Alloy Rolled Stock	No Bushing Bronze Strap	No Bushing	No Bushing Ball Thrust (2 Bear.)	3	
Rocket	C	.454	Alum. Alloy	6 Bolts	Alum. Alloy	Integral	Alum. Alloy	Steel, Hardened	Steel, Stamping	No Bushing	No Bushing	Steel Bushing	2	Rotary, Rear Shaft
G. H. Q.	C	.518	Gray Iron	Bolts	Alum. Alloy, Die Cast	Screws	Alum. Alloy, Die Cast	Steel	Bronze	No Bushing	No Bushing	Bronze Bushing	4	
Dennymite	C	.573	Iron Alloy	2 Screws	Iron Alloy	Integral	Alum. Alloy	Iron, Cast	Alum. Alloy	No Bushing	No Bushing	Bronze	4	
Pacemaker "50"	C	.594	Mag. Alloy, Iron Liner	Integral	Magnesium, Forged	Screws, No Gasket	Magnesium Alloy	Iron, Mechanite	Alum.-Bronze	No Bushing	No Bushing	2 Ball	2	Rotary, Disk Type
Brown Junior "B"	C	.601	Steel	Threaded	Steel	Integral	Alum. Alloy,	Steel	Steel	No Bushing	No Bushing	Bronze	4	
Barker	C	.604	Steel, Alloy	4 Bolts	Steel, Alloy	Integral	Magnesium Die Cast	Steel, Pressed	Dural Forging	Bronze Bushing	Bronze Bushing	Br. Bushing, Ball Thrust	2	Rotary, Adj. Timing
Wasp-Twin	C	.604	Steel, Turned	Permanently attached	Alum. Alloy, Intracast	Screws	Alum. Alloy, Intracast	Steel, Hardened	Alum. Alloy, Intracast	No Bushing	No Bushing	2 Br. Bush. Ball Thrust	2	Rotary, Shaft Type (rear)
Atomic	C	.604	Alum. Alloy, Sand Cast, Mec. Liner	Integral	Alum. Alloy, Sand Cast	6 Screws	Alum. Alloy, Sand Cast	Alum. Alloy	Dural, 24 ST	Bronze Bushing	Bronze Bushing	Ball, Ball Thrust	3	Rotary, Disk Type
Fleetwind	C	.604	Steel, Hardened	4 Bayonet Locks	Steel	Integral	Alum. Alloy, Die Cast	Steel, Hardened	Alum. Alloy Forging	Bronze Bushing	Bronze Bushing	Bronze Bushing	2	Rotary, Disk-Type
Hornet "60-A"	C	.604	Alum. Alloy Mec. Liner	4 Screws	Alum. Alloy 142-T2	6 Screws	Alum. Alloy 356-T6	Alum. Alloy 142-T571	Dural, 14S Forging	Bronze Bushing	Bronze Bushing	2 Ball	2	Rotary, Disk-Type

MODEL MOTOR SYMPOSIUM

TABLE 2. MODEL ENGINE DIMENSIONS AND PERFORMANCE DATA

	Class	Displacement Cu. In.	Bare Engine Weight, Ozs.	Weight per Cu. In. Disp., Lbs.	No. of Cylinders	Cylinder Bore and Stroke	Stroke-Bore Ratio (to 1)	Cylinder Compression Ratio (to 1)	Rated Horsepower	Revolutions per Minute at Rated Horsepower	Maximum Brake Horsepower	Revolutions per Minute at Max. Brake H.P.	Max. Brake H.P. per Cu. In. Disp.	Engine Weight per Brake H.P., Lbs.	Recommended Propeller Dia., In.	Recommended Propeller Pitch, In.	Revolutions per Minute with Recommended Prop.	Type of Mount
Elf Single	A	.097	3.00	1.93	1	.468 x .564	1.21	7.00	1/12	8,000	...	......	......	.....	9-8	6-5	8,000	Beam
Super Atom	A	,098	2.00	1.27	1	.500 x .500	1.00	5.00	1/10	......	...	......	......	.....	10-9	6-7	......	Beam
Arden	A	.099	2.37	1.50	1	.495 x .516	1.04	....	1/10	10,000	...	......	......	.....	8	4	10,000	Radial
Marvin Junior	A	.140	5.00	2.23	1	.562 x .562	1.00	7.00	1/10	7,500	...	......	......	.....	9 8	3 6	7,500 8,500	Beam-Radial
Perky	A	.191	3.00	.96	1	.609 x .656	1.08	5.00	1/7	7,000	1/6	12,000	.872	1.12	9	4	......	Bm.-Rd.
Elf Twin	A	.195	5.00	1.60	2	.468 x .564	1.21	7.00	1/6	7,500	...	......	......	.....	9.6	6	8,100	Radial
Ohlsson "19"	A	.197	4.00	1.27	1	.687 x .531	.77	....	1/7	7,000	...	......	......	.....	10-9	5	......	Bm.-Rd.
Husky "JV"	A	.199	3.50	1.10	1	.638 x .625	.98	5.70	1/6	7,000	...	......	......	.....	11	..	7,000	Beam
Bantam	A	.199	3.25	1.02	1	.656 x .590	.90	8.00	1/7	7,350	...	......	......	.....	10 9	High 6	7,050 11,300	Beam
Ohlsson "23"	B	.232	4.50	1.21	1	.687 x .625	.91	6	1/6	7,500	...	......	......	.....	10	6	......	Bm.-Rd.
Merlin	B	.232	5.50	1.48	1	.687 x .625	.91	6.00	1/6	7,000	...	......	......	.....	10	8	7,000	Beam
Super Hurricane	B	.244	5.25	1.34	1	.687 x .656	.95	....	1/6	9,000	...	......	......	.....	11	..	6,500	Beam
Bullet	B	.276	4.75	1.08	1	.750 x .625	.83	....	....	......	...	......	......	.....	11 9	12 10	6,000 9,000	Beam
Mecraft	B	.287	5.50	1.20	1	.766 x .625	.82	7.00	1/5	10,000	...	......	......	.....	11-10	4-6	8,000	Beam
Rogers "29"	B	.292	4.75	1.02	1	.812 x .562	.69	....	1/6+	7,500	...	......	......	.....	11-10	7-6	10,300	Beam
Thor	B	.292	4.50	.96	1	.812 x .562	.69	9.00	1/6	8,000	...	......	......	.....	10-11-12	6-8	8,000	Beam
Forster "29"	B	.297	5.75	1.21	1	.750 x .672	.90	9.00	....	Alcohol Gasoline	.382 .321	13,100 11,400	1.286 1.081	.94 1.12	11 9	6 8	7,200 up	Beam-Radial
Torpedo	B	.298	7.00	1.47	1	.725 x .724	1.00—	7.00	1/5	8,000	...	......	......	.....	11	6	8,000	Bm.-Rd.
Cannon "300"	B	.299	6.50	1.36	1	.750 x .678	.90	....	1/5	5,000	...	......	......	.....	14	8	......	Beam
O. K. "29"	B	.299	5.50	1.15	1	.760 x .660	.87	6.00	1/6	9,000	1/6	9,000	.557	2.06	11	6	8,500	Bm.-Rd.
De Long "30"	B	.300	8.00	1.67	1	.750 x .680	.91	10.00	1/5	8,000	...	......	......	.....	11-9	8-10	......	Beam
Phantom "P-30"	B	.300	6.87	1.56	1	.715 x .750	1.05	5.75	1/5	8,500	...	......	......	.....	11	8	8,200	Beam
Vivell "35"	C	.347	7.25	1.31	1	.768 x .750	.99	....	1/5	......	...	......	......	.....	11	..	8,000	Beam
Rogers "35"	C	.348	4.75	.85	1	.888 x .562	.64	....	1/5	7,500	...	......	......	.....	11-12-13	7-8-9	......	Beam
Cannon "358"	C	.359	6.50	1.13	1	.750 x .812	1.08	....	1/4	5,500	...	......	......	.....	14	8	......	Beam
Wenzen	C	.359	6.00	1.04	1	.750 x .812	1.08	5.50	1/5	6,200	...	......	......	.....	13	..	......	Beam
Elf Four	C	.389	9.00	1.45	4	.468 x .564	1.21	7.00	1/3	8,000	...	......	......	.....	13	5-7 1/2	7,800	Radial
Rocket	C	.454	9.00	1.24	1	.812 x .875	1.08	....	....	......	...	......	......	.....	..	..	......	Beam
G. H. Q.	C	.518	10.00	1.21	1	.937 x .750	.80	8.00	1/5	7,000	...	......	......	.....	14	8	7,000	Beam
Dennymite	C	.573	11.00	1.20	1	.900 x .900	1.00	5.50	....	......	1/4	6,800	.436	2.75	13-14	..	6,500	Beam
Pacemaker "59"	C	.594	12.00	1.26	1	.930 x .875	.94	10.00	....	......	...	......	......	.....	10	10	15,000	Beam
Brown Junior "B"	C	.601	7.50	.78	1	.875 x 1.000	1.14	6.50	1/5	5,200	.247	7,200	.411	1.90	14	8	5,200	Beam
Barker	C	.604	11.00	1.14	1	.937 x .875	.93	8.00	1/3+	15,000	...	......	......	.....	14 10	6 8	7,800 14,800	Beam
Wasp-Twin	C	.604	9.50	.98	2	.740 x .702	.95	7.00	1/2 Est.	10,000 Est.	...	......	......	.....	10-11	..	7,000- 10,000	Beam
Atomic	C	.604	13.00	1.34	1	.937 x .875	.93	13.00	3/4	16,000	...	......	......	.....	10	12	18,000	Beam
Fleetwind	C	.604	11.50	1.21	1	.937 x .875	.93	6.00	....	......	.41	8,600	.679	1.75	13	8	10,000	Beam
Hornet "60-A"	C	.604	14.00	1.45	1	.937 x .875	.93	....	....	......	.82	13,800	1.358	1.07	..	..	......	Beam
Howler	C	.604	13.08	1.35	1	.937 x .875	.93	12.00	....	......	...	......	......	.....	9	10	11,000	Beam
Ken "610"	C	.604	15.50	1.60	1	.937 x .875	.93	....	3/5	14,000	.60	14,000	.993	1.61	..	..	......	Beam
Ohlsson "60"	C	.604	9.00	.93	1	.937 x .875	.93	6	1/4	7,500	...	......	......	.....	13	8	......	Bm.-Rd.
O. K. Super "60"	C	.604	12.00	1.24	1	.900 x .950	1.07	6.00	1/3	8,750	1/3	8,750	.552	2.25	14	6	8,500	Beam
O. K. Special	C	.604	10.25	1.06	1	.900 x .950	1.07	6.00	1/4	5,675	1/4	5,675	.414	2.56	14	10	5,000	Bm.-Rd.
McCoy	C	.607	14.00	1.44	1	.940 x .875	.93	8.00	9/10+	14,000	...	......	......	.....	9	10	14,400	Beam
O. K. De Luxe	C	.616	10.50	1.07	1	.900 x .969	1.08	6.00	1/4	5,500	1/4	5,500	.406	2.62	14	10	5,000	Bm.-Rd.
Super Champion	C	.624	11.00	1.10	1	.940 x .900	.96	8.00	3/5	12,500	...	......	......	.....	12-14 10	6-8 10-12	9,000 12,000	Beam
Super Cyc., Dual Ig.	C	.647	7.25	.70	1	.937 x .937	1.00	....	1/4	7,300	...	......	......	.....	14	8	......	Beam
Bond	C	.680	11.00	1.01	1	.945 x .969	1.03	....	....	15,000	3/4	......	1.103	.92	16	8	......	Beam
Molnar	C	.785	16.00	1.27	1	1.000 x 1.000	1.00	5.30	....	......	...	......	......	.....	15-16	..	12,000	Beam
Forster Super "99"	C	.997	15.00	.94	1	1.062 x 1.125	1.06	8.50	....	......	...	......	......	.....	14-16 18-20	8 6-5	4,500- 6,800	Radial
O. K. Twin	C	1.208	23.00	1.15	2	.900 x .950	1.07	6.00	1/2	5,675	1/2	5,675	.414	2.75	18	8	5,000	Radial
Avion Mercury "45"		1.600	20.00	.78	1	1.250 x 1.312	1.05	9.43	7/10	3,800	3/4	4,000	.466	1.67	20	10	4,000	Beam


"SPUNKY"
1/6 SIZE
TIP RIB (2)
MAIN RIB (16) CUT ALL RIBS FROM 1/16" SHT.
3/4"
1"
16"
2"
THESE WING RIBS ARE SPACED 1-1/2" APART
1/4" SQUARES
TIP OUTLINES ARE CUT FROM 1/8" SHT. BALSA
1/16"x1-1/4" SHT.
1/8"x1/8" L.E.
1/8" SHT. BALSA GUSSETS
1/8"x1/2" T.E.
PROPELLER BLANK 1-1/2"x2"x11" BALSA
NOTE 22-3/8" IS THE TRUE LENGTH OF FRAME
THESE CROSS BRACES SPACED 1-1/2" APART
1-5/8"
2-1/8"
1/8"x1/4"
1/8" SHT. BALSA
CUT OUT FOR WHEEL
1/16" SHT. BALSA
1/8"x1/8" BALSA
TOP STRINGER 1/16"x3/16"
UPRIGHT 1/16"x1/16"
SIDE STRINGERS 1/16"x1/16"
SPACERS 1/16"x1/16"
SPACERS AND UPRIGHTS CUT TO FIT STRINGERS
3/16" DIAMETER PINE DOWEL
RUDDERS OUTLINE 1/8" SHT.
1/8"x1/8"
LAMINATED SHT. PINE
RUBBER LOOP
WIRE LEG
.040" WIRE
WING MOUNT
1/16" GUSSETS
WHEEL RETRACTED
A
B
C
BOTTOM STRINGER 1/8"x3/16" TAPERS TO 1/8"x1/32"
1/16" SHT. PLYWOOD
1/8" LAMINATED BALSA
1-1/2"
BALL BEARING
1/8" SHT. BALSA
1/16" SHT PLYWOOD
1" DIAMETER WHEEL
TIN FRONTPLATE
.067" WIRE PROPSHAFT
SPRING
ELEVATOR RIB 1/16" SHT. (9)
6"
2-1/4"
1-3/4"
1/2"
ELEVATOR HAS SAME CONSTRUCTION AS THE WING (SEE ABOVE)
PLAN 1/3 ACTUAL SIZE
DRAWN by JAY T. HOLMES

SPUNKY

by GABRIEL BEDISH

This streamlined little ship has the design features needed to turn in super performance

HERE'S that new postwar job that you've been waiting for! *Spunky* is a compact, super-streamlined ship with plenty of the stuff needed to get those first places. Proof of this is in the fact that of three ships built not one has stayed with the owner for more than nine flights.

But enough of talk. Just feast your peepers on those curves and brother—she sells herself!

As good a place as any to start is in scaling up the plans. A piece of brown wrapping paper will suffice for the drawings. This type takes pencil lines easily and erases neatly.

FUSELAGE—Dig out four strips of hard 1/8" sq. balsa for the longerons. Maintain balsa of equal strength to keep the fuselage from warping out of line. Layout the two sides, building one over the other to assure perfect alignment; then trim the rear to fit and glue the sides together there. Insert crossbraces starting from the rear of the fuselage and working forward. After all crossbraces are in place, plank in the indicated positions with their respective materials. Place the sub-rudder, formers, wing mount and the nosepiece in their correct positions, then attach the stringers.

The nosepiece is assembled by laminating two pieces of 1/8" hard sheet balsa and attaching the plywood to one side. After drying, cut out the center portion as illustrated. Be sure to save this portion because by reversing it, it may be used as the nose plug. Now assemble the retractable landing gear. Make sure the rubberband which pulls up the gear does not create too much tension so as to cause the gear to fold prematurely on R.O.G. flights. Lubricate the rubberband to keep it operating smoothly against the metal surfaces.

WING ASSEMBLY—Cut out all parts used in assembling the wing. The ribs are of 1/16" hard sheet balsa, while the tip outlines are of medium 1/8" balsa sheet. Build 1/2 of the wing over the plan by first assembling the outline, then inserting the ribs. When thoroughly dry, remove it from the plan and build the other half directly on the underside to assure symmetry; then put in the proper amount of dihedral at the positions designated. Following this, insert the gussets which are made of 1/32" sheet balsa. Next, plank the leading edge with 1/32" medium hard sheet balsa of the straight-grained variety. Be sure to get plenty of glue around the dihedral joints to insure strength at these vulnerable positions, as a precaution against the abuse and mishandling that all models seem to go through at one time or another. Place the two 3/32" sheet balsa centersection panels in their respective positions to provide a surface for the wing to rest against.

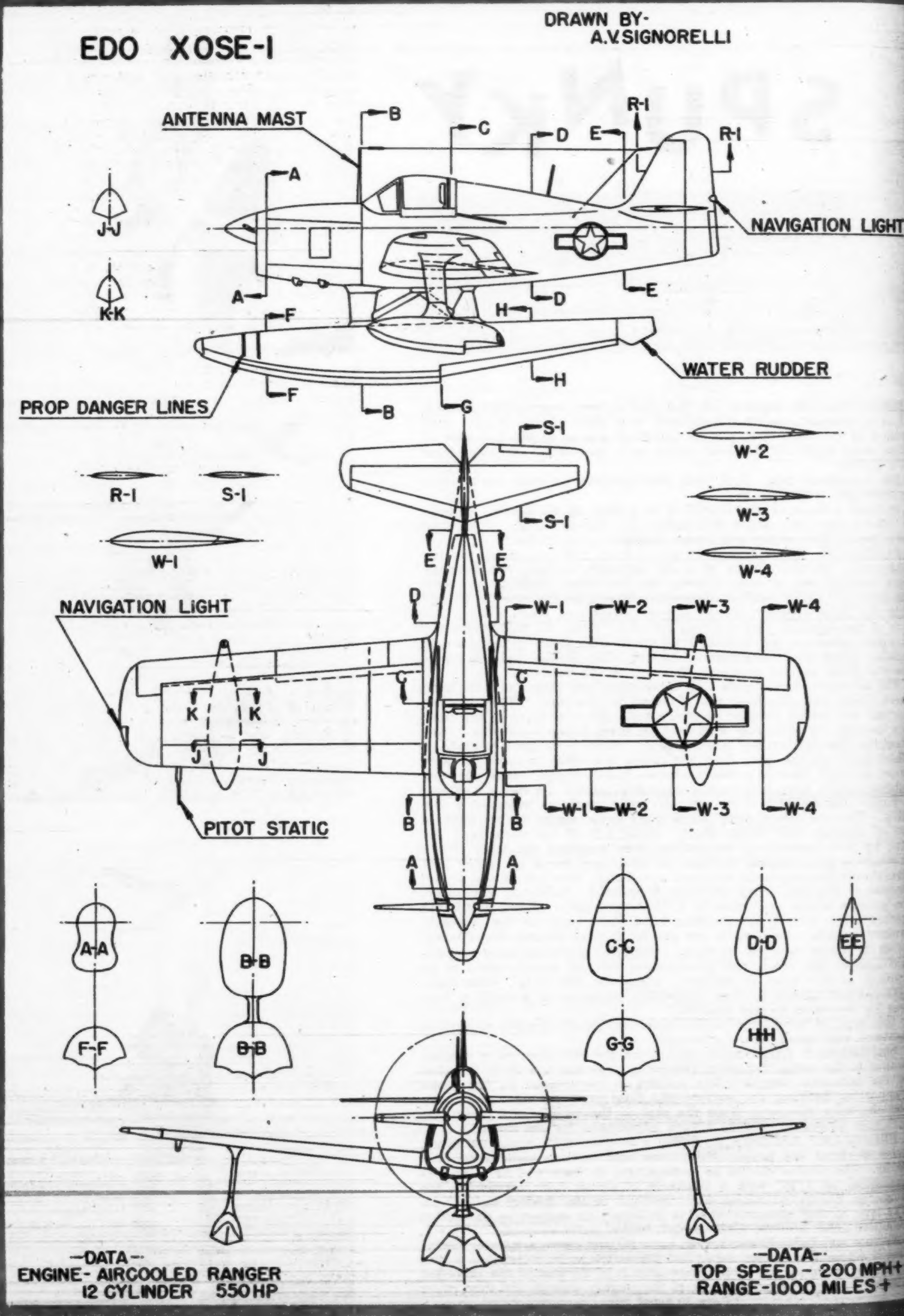
This type of wing construction embodies great strength as well as lightness and aerodynamic efficiency.

EMPENNAGE ASSEMBLY—Construct the stabilizer in a manner similar to the wing, except in respect to inserting a reverse dihedral of the indicated degree. The rudder is constructed in the usual manner by building the outline and then inserting the crossbraces. Cut the trim tab away from the rest of the rudder and insert the soft wire hinges to provide a turn adjustment for the model.

PROPELLER ASSEMBLY—Select a medium soft, straight-grained, balsa block of the proper dimensions and carve a right-hand propeller. The blades should be symmetrical in form and have an undercamber of 3/16" with a thickness of about 1/8". Assemble the hinge, as illustrated, along with the rest of the folding equipment. The type of stop assembly used is definitely an answer to the bulky, repulsive affair seen on many models today.

From a soft balsa block, 1-1/2" cube in size, carve a spinner. Splitting it across the center, carve out the inside so as to provide a free operating space for the stop. Then glue it to the rest of the propeller assembly. Sand the propeller until thoroughly smooth and then cover

(*Turn to page 103*)


EDO XOSE-1
DRAWN BY-
A.V.SIGNORELLI
ANTENNA MAST
NAVIGATION LIGHT
WATER RUDDER
PROP DANGER LINES
J-J
K-K
R-1
S-1
W-1
W-2
W-3
W-4
NAVIGATION LIGHT
PITOT STATIC
A-A
B-B
C-C
D-D
E-E
F-F
B-B
G-G
H-H
--DATA--
ENGINE- AIRCOOLED RANGER
12 CYLINDER 550HP
--DATA--
TOP SPEED - 200 MPH+
RANGE-1000 MILES+

EDO

XOSE-1

PLANE ON THE COVER STORY

by ROBERT McLARREN

LIKE most American aviation pioneers, the name of Earl D. Osborne is shrouded in obscurity. Paradoxically, however, his firm is as well known in the U. S. and even better known throughout the world as such famous other pioneers as Wright, Curtiss, etc. This strange situation was created back in 1926 when Osborne formed his company. Instead of naming it Osborne Aircraft Co. he used only his initials: EDO Aircraft Corp., "EDO" being formed from the name Earl D. Osborne.

Osborne's early experience included a tour of duty as engineer with L.W.F. Engineering Co. (formed by Lowe, Willard and Fowler, who coincidentally manufactured aircraft with Laminated Wood Fuselage construction) and later publisher of *Aviation magazine*. It became evident to Osborne that a commercial market existed for a really good all-metal aircraft float, so he set out to prove his conviction. How he succeeded is a well known story throughout the world where Edo floats comprise the vast majority of those used on every continent, major river, lake and ocean.

There have been no major polar explorations, no historic aerial explorations or long distance flights by seaplanes that did not start and return to land on Edo floats: Lindbergh's famous Lockheed *Sirius*, Byrd's Curtiss-Wright *Condor*, Ellsworth's Northrop *Gamma*, Earhart's Lockheed *Vega* and many others. It is safe to say there is no major American aircraft, commercial, transport or private of the single or twin engine type that has not been equipped with Edo floats, and it would require the remainder of this article to list various types, models and companies that created Edo-equipped seaplane models of their landplanes. Of even greater importance, however, is the astonishing quantity of engineering installation work performed by Edo on each of these planes. From tiny Aeroncas to giant Martin bombers and Douglas DC-3's, Edo has meticulously performed stress analyses, recommended minor structural changes and designed special length struts, brackets and fittings for hundreds of planes.

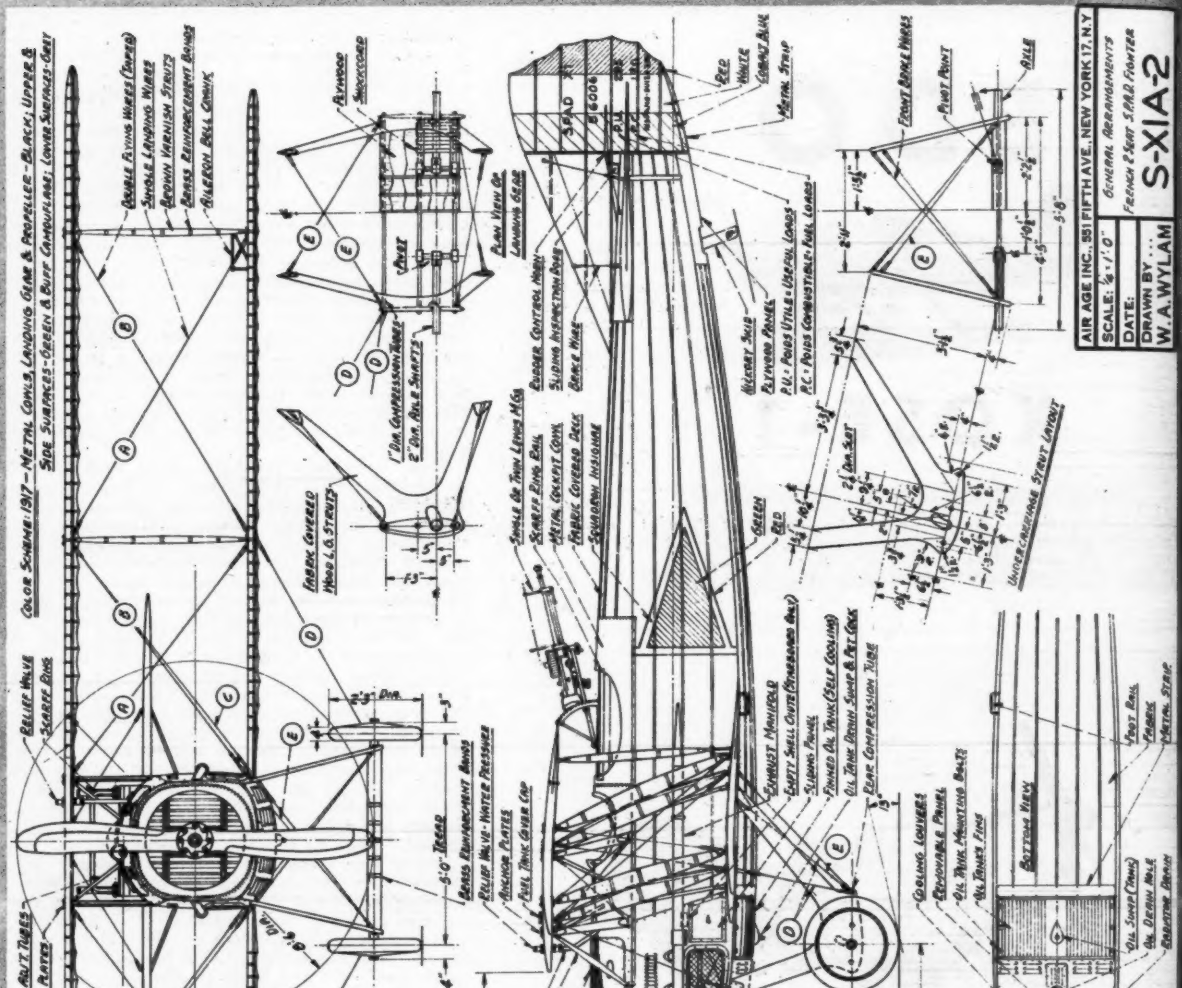
But it was Edo's war work that brought the company into the stable of national defense thoroughbreds. One of its most unique jobs was the conversion of a 17 ton Douglas C-47 Army transport plane into an amphibian in 1943. This design, the XC-47C, was equipped with two of the largest floats ever built and flown in the U. S., the Edo Model 78. These giant floats included two main wheels and two nose wheels, which retracted hydraulically into the floats for water landings yet supported the transport for ground landings. A similar pair of four-wheel floats were developed for the Stinson L-1A *Vigilant*, although much smaller in size and electrically operated.

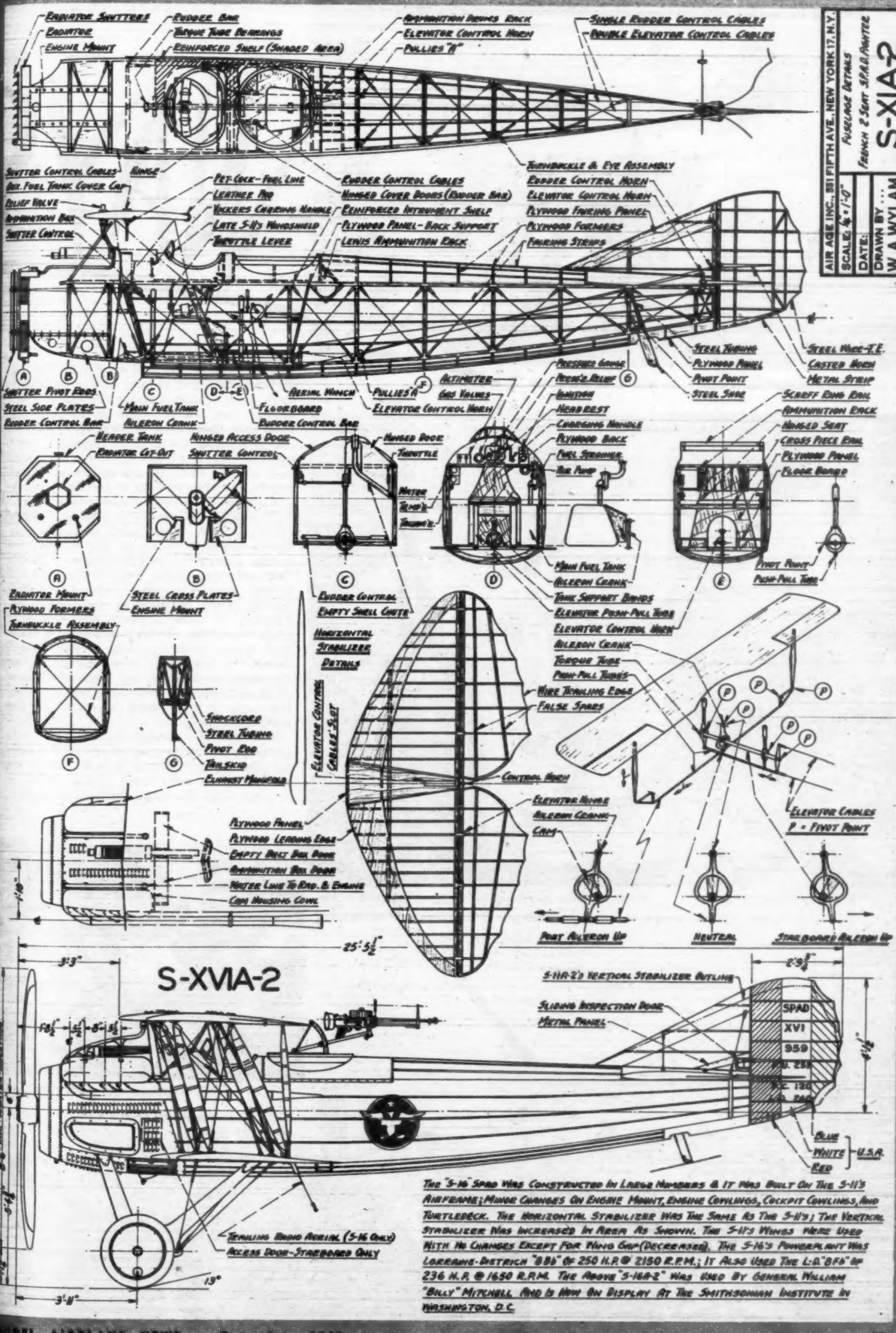
Although production in quantity was at top capacity during 1944 for such planes as Vought OS2U-3 *Kingfisher*, Curtiss SO3C *Seamew*, Vought SB2U-3 *Vindicator* and Army Piper L-4 and Vultee L-5 *Grasshopper* designs, Edo undertook additional war work and began fabricating sub-assemblies for the badly needed Grumman F6F *Hellcat*.

As the war came to a close Edo was in production on floats for Curtiss SC-1 *Seahawk*, wingtip floats for Martin *Mars*, floats for Army Noorduyn C-64 *Norseman* and sub-assemblies for the *Hellcat*. The *Seahawk* floats were unique in that they incorporated internal bomb bays. By V-J Day, Edo had produced over 95% of the dollar volume of floats used by Army and Navy, many of which went abroad on Lend-Lease to the Allied Nations.

In April 1944 Osborne and his Chief Engineer Boris V. Korvin-Kroukovsky decided that the step from designing, manufacturing, installing and servicing floats to a complete airplane seemed a logical one and the pressure of the war effort made it a necessary one. But, as in all military aircraft, this float-equipped plane had to be different . . . and better! Its range had to be a little greater, its maintenance problems more simple, its performance a little better and its usefulness with the fleet more effective. Osborne and Kroukovsky conferred with Bureau of Aeronautics and a tentative specification was prepared for a single-

(*Turn to page 67*)


AIR AGE INC., 551 FIFTH AVE., NEW YORK 17, N.Y.
SCALE: 1/8" = 1'0"
DATE:
GENERAL ARRANGEMENTS
FRENCH 2-SEAT S.P.A.D. FIGHTER
DRAWN BY ... W.A. WYLAM
S-XIA-2


AIR AGE, INC., 551 FIFTH AVE., NEW YORK 17, N.Y.
SCALE: ¼"=1'-0"
FUSELAGE DETAILS
FRENCH 2 SEAT S.P.A.D. PAINTER
S-XIA-2
DRAWN BY...
W. A. WYLAM
S-XVIA-2
HORIZONTAL STABILIZER DETAILS
PORT AILERON UP
NEUTRAL
STARBOARD AILERON UP
ELEVATOR CABLES
P = PIVOT POINT
SPAD
XVI
959
BLUE
WHITE
RED
U.S.A.
25' 5½"
3'3"
3'11"
13°
THE "S-16" SPAD WAS CONSTRUCTED IN LARGE NUMBERS & IT WAS BUILT ON THE S-11'S AIRFRAME; MINOR CHANGES ON ENGINE MOUNT, ENGINE COWLINGS, COCKPIT COWLINGS, AND TURTLEDECK. THE HORIZONTAL STABILIZER WAS THE SAME AS THE S-11'S; THE VERTICAL STABILIZER WAS INCREASED IN AREA AS SHOWN. THE S-11'S WINGS WERE USED WITH NO CHANGES EXCEPT FOR WING GAP (DECREASED). THE S-16'S POWERPLANT WAS LORRAINE-DIETRICH "8Bb" OF 250 H.P. @ 2150 R.P.M.; IT ALSO USED THE L-D "8Fb" OF 236 H.P. @ 1650 R.P.M. THE ABOVE "S-16A-2" WAS USED BY GENERAL WILLIAM "BILLY" MITCHELL AND IS NOW ON DISPLAY AT THE SMITHSONIAN INSTITUTE IN WASHINGTON, D.C.

AIR-WAYS

No. 1 Chuck Hollinger wades right in to launch his R.O.W. job

No. 2 Tex Russell and his winner No. 3 H. Schoenky holds helicopter and trophy it won

No. 4 Winners at Western Open were taken to Nationals by Ohlsson & Rice, shown surveying group

SIDELIGHTS OF THE NATIONALS. The Big Show is over and presumably most participants have rested up and regained lost sleep. Official results are tabulated elsewhere in this issue and in our November issue. Not much has been said, however, of the amusing sidelights that always crop up at such events and which, whether serious at the time or not, are always good for a chuckle later on.

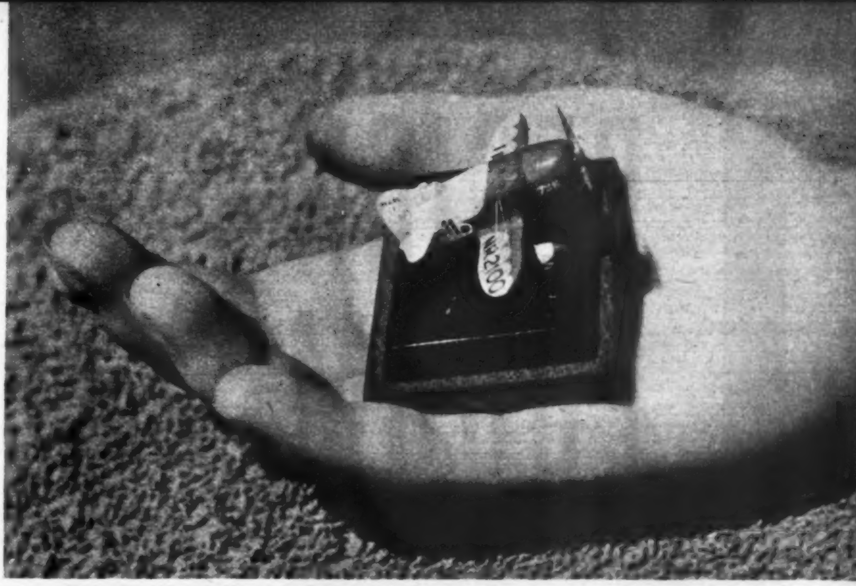
For instance, take the case of Henry Doré of New York who had the only diesel-powered entry in the R.O.W. gas event. Henry labored for hours to get his ship off the water but every attempt ended in failure, often with the model upside down waiting to be fished out. Finally, to show scoffers that the ship could really fly, Henry removed the floats and hand launched his model, which showed a very good steep climb. After the motor cut, the model went into a slow glide and spiraled down to a perfect landing—yes, you guessed it—right in the middle of the pond!

The R.O.W. event, incidentally, was probably as interesting as any at the meet for the many spectators, but results we are sorry to note were rather poor. It seemed that the boys built aerodynami-

No. 5 Nightwork at the Nationals

No. 6 Lidgard and Fromm perform winding operati

News of model airplane experimenters from all over the world, with pictures and comment on the '46 Nationals



No. 12 Housed in jewel case! A 1/144 scale Gee Bee *Super Sportster* with 2" span by E. White

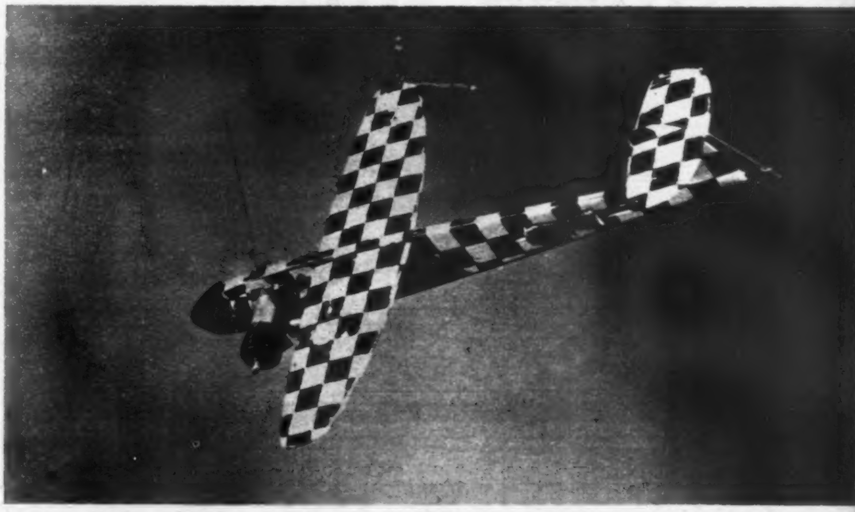
cally efficient ships, to which hastily designed floats were attached. Result was that the models were hydrodynamically poor and many never got a chance to show their flying qualities.

News went around after the first day of free flight gas competition that a place had been won in the Open Class A event by Winnie Davis, the only woman to place in the whole meet up to that time. Further investigation disclosed however that Winnie, whose real name is not at all like a girl's, is a husky young man from Kansas City.

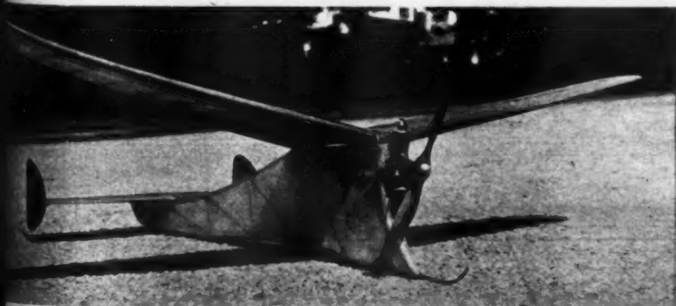
This same Mr. Davis, incidentally, might have done considerably better than he did with his own models except for the fact that he spent a good part of his time at the meet helping out the radio control contestants for whom he acted as chief launcher and handyman.

Speaking of radio control, there were only three entries, one of whom never got a chance to fly his ship. This contestant, Paul Helphinstine, acted as crew chief for the second place winner and was so busy at it that though he had his ship ready to go several times he never did get a chance to try it.

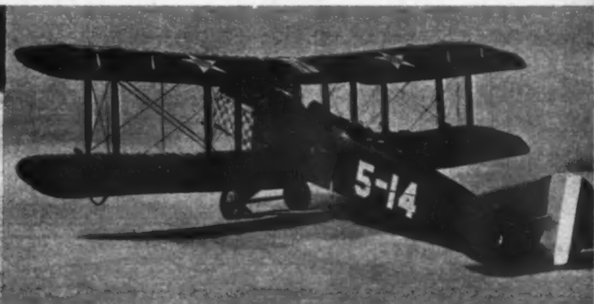
(*Turn to page* 70)



No. 11 Very unusual control liner with a dazzle paint job and profile fuselage by J. L. McLarty



.9 Original design by Austin Meissner who claims superior performance



No. 10 Donald Hoff built this highly detailed ½" scale DeH4.

.7 Wife of J. M. Wade poses with Wakefield model

No. 8 Here is a *Dragonfly* from M.A.N. plans built in Guatemala by Wolf Rosenthal

AIR-WAYS

No. 1 Chuck Hollinger wades right in to launch his R.O.W. job

No. 2 Tex Russell and his winner

No. 3 H. Schoenky holds helicopter and trophy it won

No. 4 Winners at Western Open were taken to Nationals by Ohlsson & Rice, shown surveying group

SIDELIGHTS OF THE NATIONALS. The Big Show is over and presumably most participants have rested up and regained lost sleep. Official results are tabulated elsewhere in this issue and in our November issue. Not much has been said, however, of the amusing sidelights that always crop up at such events and which, whether serious at the time or not, are always good for a chuckle later on.

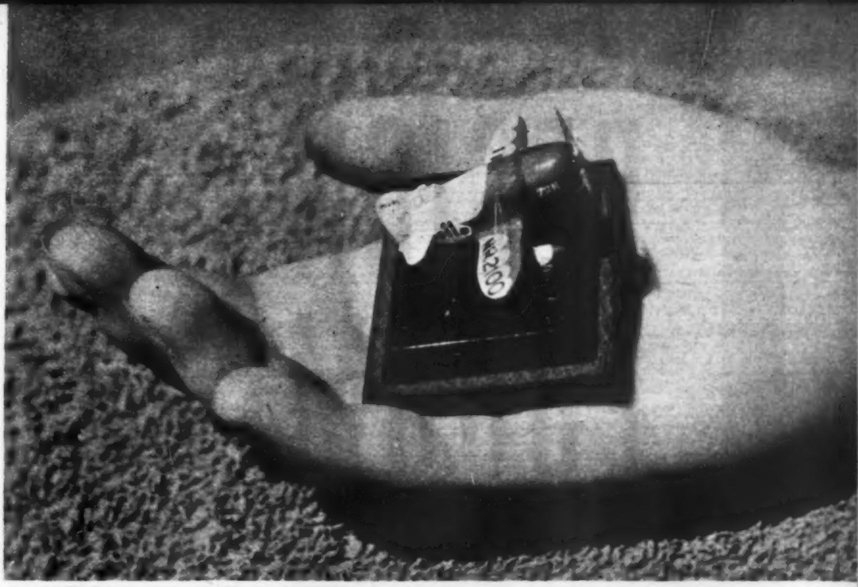
For instance, take the case of Henry Doré of New York who had the only diesel-powered entry in the R.O.W. gas event. Henry labored for hours to get his ship off the water but every attempt ended in failure, often with the model upside down waiting to be fished out. Finally, to show scoffers that the ship could really fly, Henry removed the floats and hand launched his model, which showed a very good steep climb. After the motor cut, the model went into a slow glide and spiraled down to a perfect landing—yes, you guessed it—right in the middle of the pond!

The R.O.W. event, incidentally, was probably as interesting as any at the meet for the many spectators, but results we are sorry to note were rather poor. It seemed that the boys built aerodynami-

No. 5 Nightwork at the Nationals

No. 6 Lidgard and Fromm perform winding operati

News of model airplane experimenters from all over the world, with pictures and comment on the '46 Nationals



No. 12 Housed in jewel case! A 1/144 scale Gee Bee *Super Sportster* with 2" span by E. White

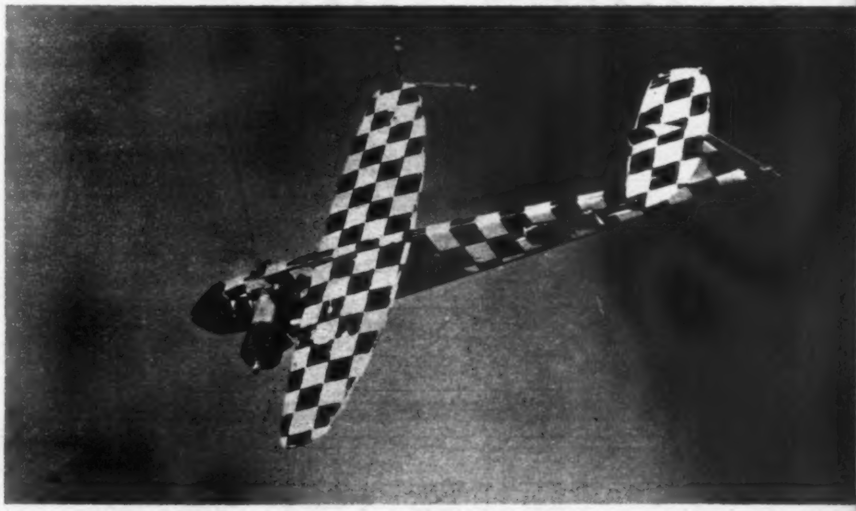
cally efficient ships, to which hastily designed floats were attached. Result was that the models were hydrodynamically poor and many never got a chance to show their flying qualities.

News went around after the first day of free flight gas competition that a place had been won in the Open Class A event by Winnie Davis, the only woman to place in the whole meet up to that time. Further investigation disclosed however that Winnie, whose real name is not at all like a girl's, is a husky young man from Kansas City.

This same Mr. Davis, incidentally, might have done considerably better than he did with his own models except for the fact that he spent a good part of his time at the meet helping out the radio control contestants for whom he acted as chief launcher and handyman.

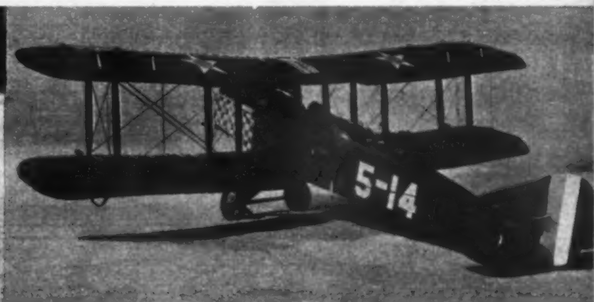
Speaking of radio control, there were only three entries, one of whom never got a chance to fly his ship. This contestant, Paul Helphinstine, acted as crew chief for the second place winner and was so busy at it that though he had his ship ready to go several times he never did get a chance to try it.

(Turn to page 70)



No. 11 Very unusual control liner with a dazzle paint job and profile fuselage by J. L. McLarty

9 Original design by Austin Meissner who claims superior performance



No. 10 Donald Hoff built this highly detailed ½" scale DeH4.

7 Wife of J. M. Wade poses with Wakefield model

No. 8 Here is a *Dragonfly* from M.A.N. plans built in Guatemala by Wolf Rosenthal

DESIGN FORUM

by CHARLES H. GRANT

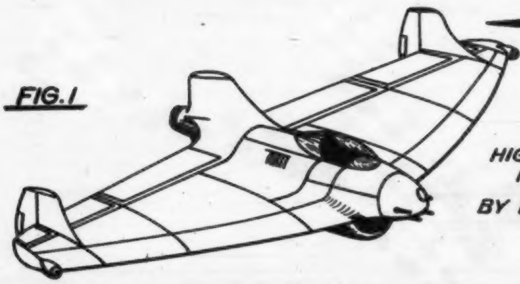
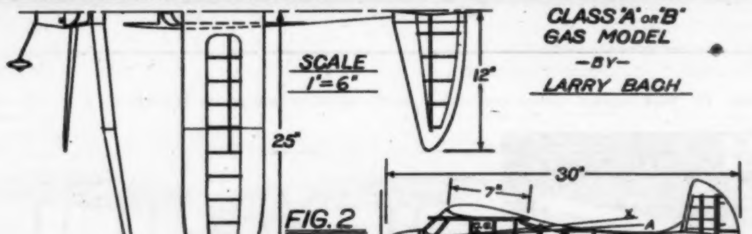


FIG. 1

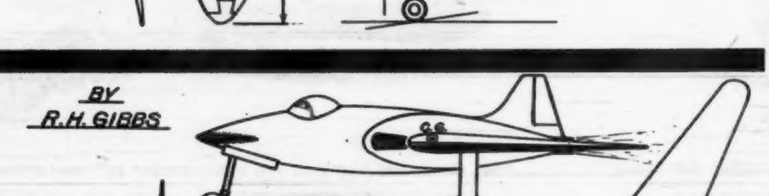
GRANT TAILLESS WING SECTION

HIGH ALTITUDE JET INTERCEPTOR BY BILL BROWNING



CLASS "A" OR "B" GAS MODEL —BY— LARRY BACH

FIG. 2



BY R.H. GIBBS

FIG. 3

TWIN JET INTERCEPTOR

THE tail of an airplane has a very useful purpose. Fundamentally it provides longitudinal stability and control. It has the disadvantage, however, of causing considerable drag especially at high speeds and for many years designers have been scheming to eliminate this troublesome necessity. They figure that if they could fly without the tail, the weight and drag of the airplane would be reduced with resultant higher performance.

Many who do not understand the problem of longitudinal stability apparently think this should be easy—that it is only necessary to cut the tail off and fly the rest of the airplane, and control it by putting elevators on the wing trailing edge. Rudders are brought forward and placed on the wing, usually at the tips. In such a case the wing trailing edge is used as the stabilizer. Commonly this trailing edge is curved upward, the whole wing forming a normal wing section with the reverse curve at the trailing edge. This shape wing section produces a stable center of pressure movement. If the trailing edge is curved up sufficiently the center of pressure will move backward toward the trailing edge when the wing noses up, and will move forward when the angle of attack decreases. Obviously this tends to correct any deviation from normal flight angle. In theory this is excellent and will work, but even in tailless planes of the most advanced type the tail moment arm or distance from center of gravity to center of the reversed curved trailing edge is very short, usually not more than 40% of the normal tail moment arm.

If the wing trailing edge has sufficient area it will overcome this disadvantage by creating a powerful righting effect. To create the same righting effect as a normal airplane the turned up trailing edge will have to be 2½ times the area of the normal airplane stabilizer when the moment arm is only 40% of the customary length.

There is one drawback to short moment arms which can only be overcome by making them longer and to which all present day flying wings are susceptible. The period of longitudinal reaction is proportional to the moment arm length. This period is very short when the moment arm is short; which means that the airplane reacts suddenly and sharply about its spanwise axis. It will nose up or down quickly and will recover quickly provided it has sufficient stability. This sudden action makes normal tailless airplanes erratic, and it has been the practice of designers to depend upon the inertia of the airplane's weight to hold it steady in flight and react against the tendencies to dive or nose up suddenly.

Designers must keep in mind, however, that while weights are helpful in this respect they are dangerous when any swinging of the airplane takes place, for then they tend to *keep* the airplane swinging and often stability is difficult to recover. This is the problem that faces all tailless airplane designers and all such craft must be judged in the light of these facts.

• •

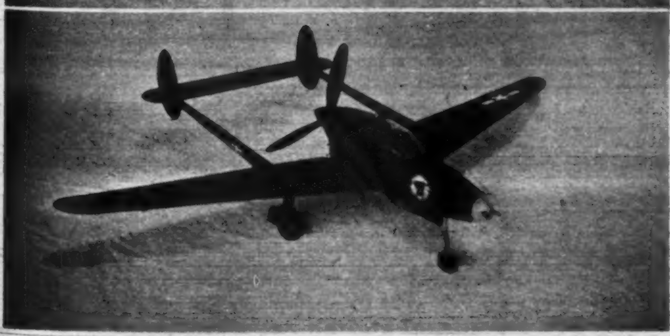
Bill Browning of Berkeley, Calif., sends us a drawing of his conception of a tailless high altitude jet interceptor. The plane is practically all-wing so that it has the greatest amount of surface for weight involved. This is excellent. The fuselage is well streamlined and faired into the wing. The intake for the jet motor is directly beneath the nose under the fuselage. Directional control is provided by two rudders at rear of two fins

(*Turn to page 60*)

PV-1 fighter

This model shows that a fast control line ship can be realistic as well

by PETER W. WESTBURG and PAUL VAN RENSSELAER



ALTHOUGH this model is quite similar in appearance to the Consolidated XP-55, it was designed and built long before the XP-55 was announced; which proves that model planes can look like real airplanes if they are designed correctly.

One of the reasons for this model's coming into being was to eliminate propeller and sparkplug breakage. A pusher airplane is ideal for such a purpose and is unique enough to be interesting in other ways as well. It will be noticed that the empennage is practically identical to that of the Lockheed P-38 series. We liked that empennage so well that we borrowed it completely, with apologies to Lockheed.

This model has been flown many times and it has no peculiarities of behavior; it is not as fast as it should be, but we believe that that is because an old engine was used. Landing is extremely easy due to the rugged nose wheel construction; the model can be practically flown into the ground without serious damage.

Before beginning construction we wish to emphasize that a simple jig will be of great help in assembling the model. This jig is shown in the sketch on page 2 of the plans. The jig supports the fuselage at the nose gear and engine mount and lines up the wing spars and tail booms as well. The model can be built without a jig but the lack of one can make an easy job hard. All the major jig dimensions are given in the plans. The engine mount attaches to Part 7 and the nose gear support rests on Part 2. The supports for the spar (Part 6) are balsa and it will be necessary to get the vertical distance of this point from the center line of thrust. The wing dihedral locates this point and the important thing to bear in mind is that both sides are identical. Part 6 is also shaped to the bottom contour of the wing at Sta. 17⅞.

Part 10 which lines up the tail booms is also balsa and is shaped to fit the tail boom contour. The vertical distance from the centerline of thrust may be obtained from the plans. Be sure to consider the thicknesses of all parts in the jig when locating these points.

DESCRIPTION OF JIG PARTS

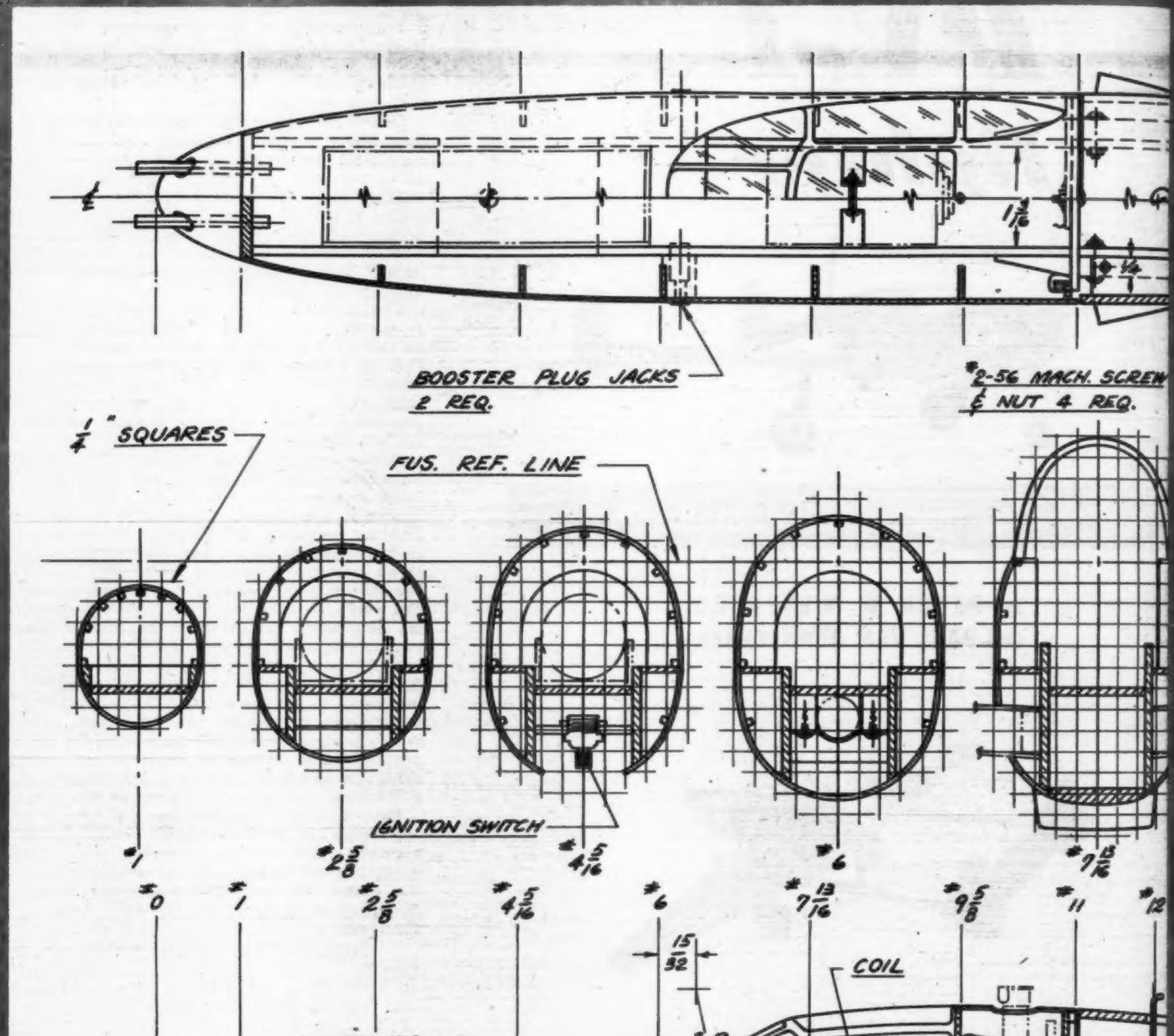
Part No.	*Size*	*Material*
1	19 ⅝" x 3" x ¾"	Pine
2	2 3/32" x 2" x 1 3/16"	Pine
3	35 ¾" x 3" x ¾"	Pine
4	3" x 2¼" x ¾"	Pine
5	3" x 3" x ¾"	Pine
6	3" x ¼" x ⅛"	Balsa
7	14 ⅜" x 3" x ¾"	Pine
8	7 ¾" x 4" x ¾"	Pine
9	13 ¼" x 3" x ¾"	Pine
10	3" x 1 3/16" x ⅛"	Balsa

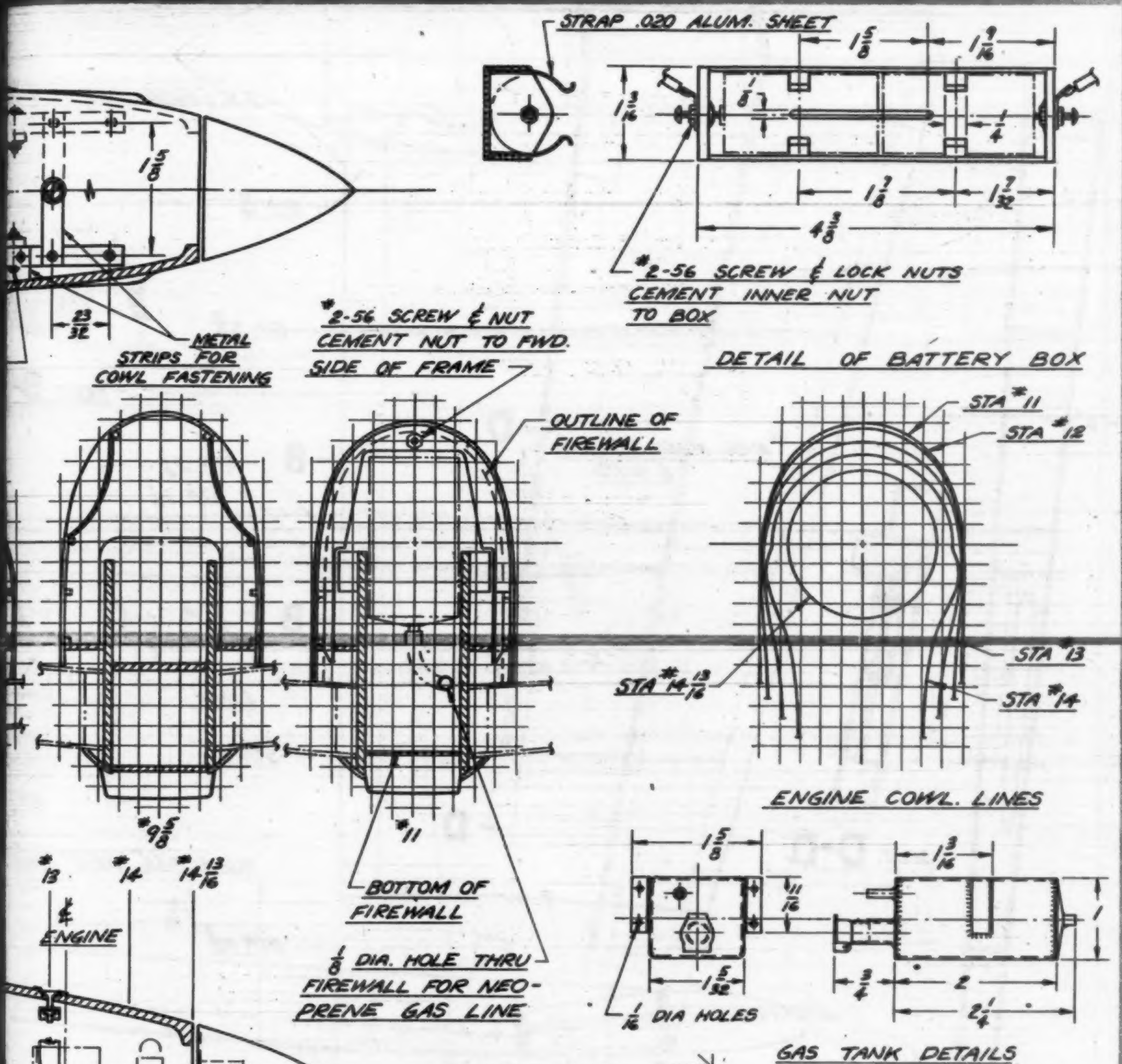
FUSELAGE INTERNAL STRUCTURE—The fuselage internal structure consists of two side beams, a centerpiece or web, a firewall and a nose wheel support. These are all made from 3/32" thick aircraft plywood. Their contours may be laid out directly on the wood. After finishing the contours put in all the holes for ignition wires, bolts, engine mounts and so forth. Cement the nuts to nose gear support before assembling these five pieces. Use plenty of glue and very small brads.

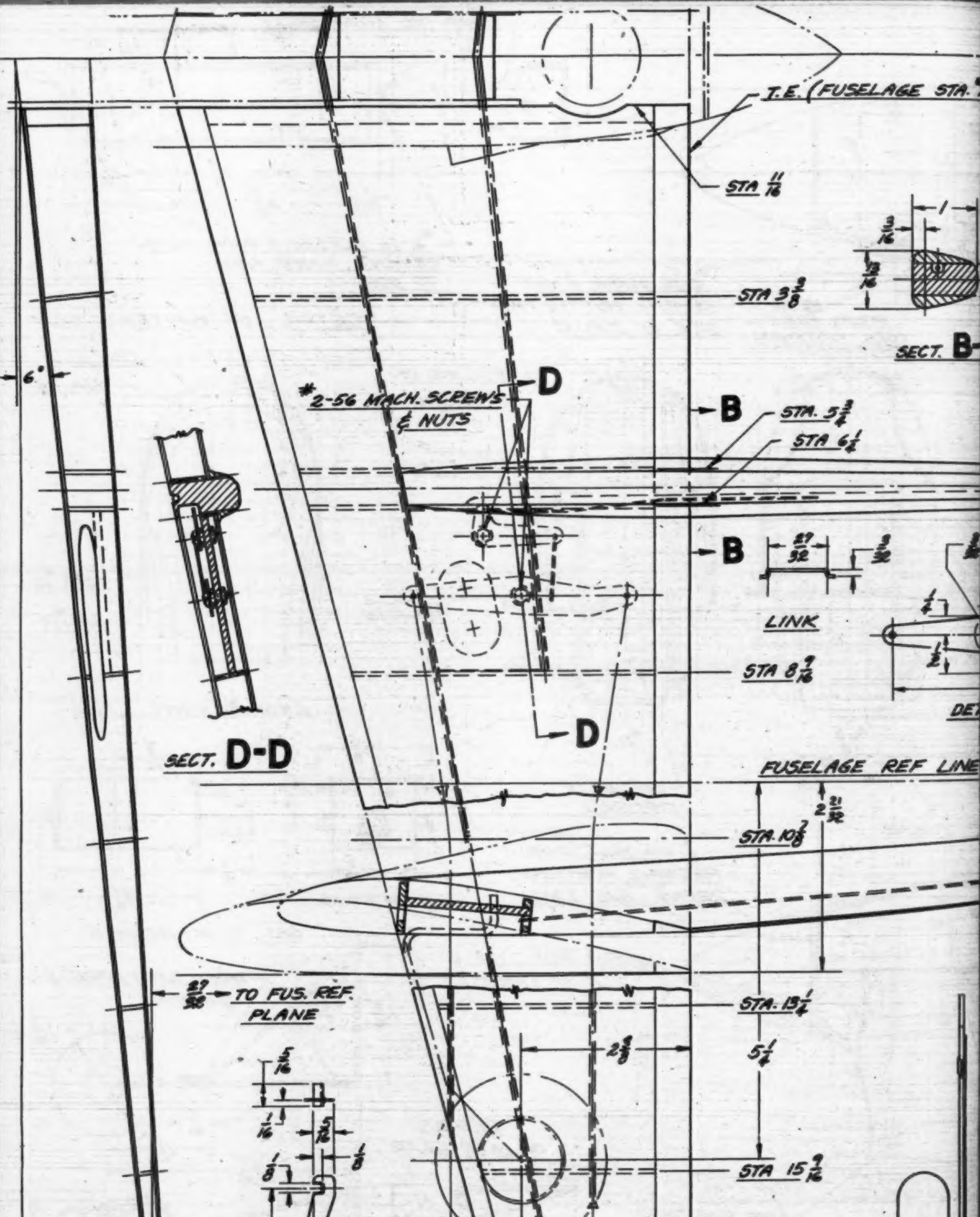
The engine mount blocks are ¼" x ½" hardwood, either hickory or mahogany or similar wood that is close-grained and will not split easily. It should be noted that these are bolted in for extra strength. The screws should not be greater than 3/32" in diameter. These mounts should also be coated with glue on the contact surfaces before assembly.

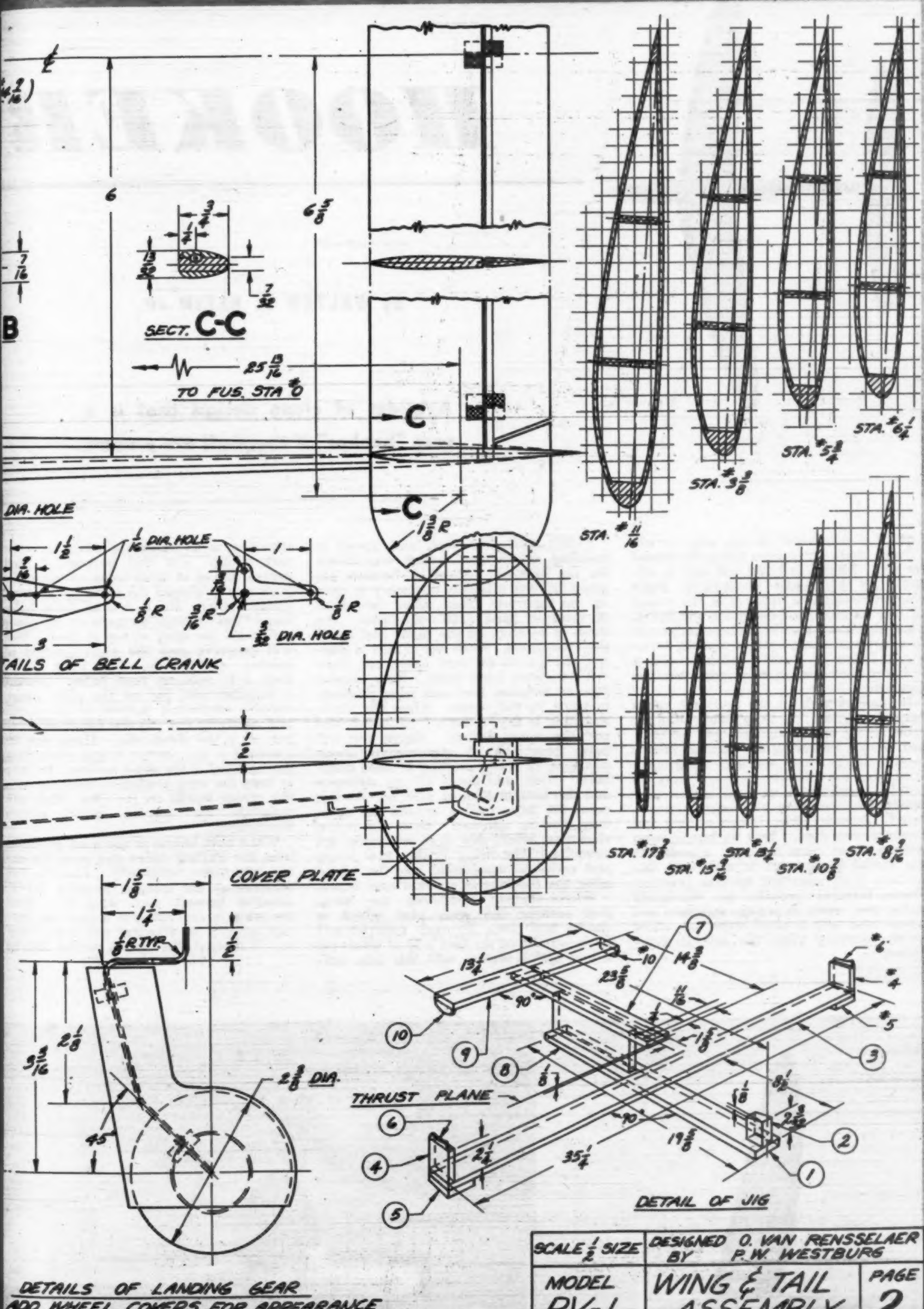
WING STRUCTURE—While the fuselage structure is setting we can make the two wing spars. The front spar is in two pieces, being jointed at the center of the airplane.

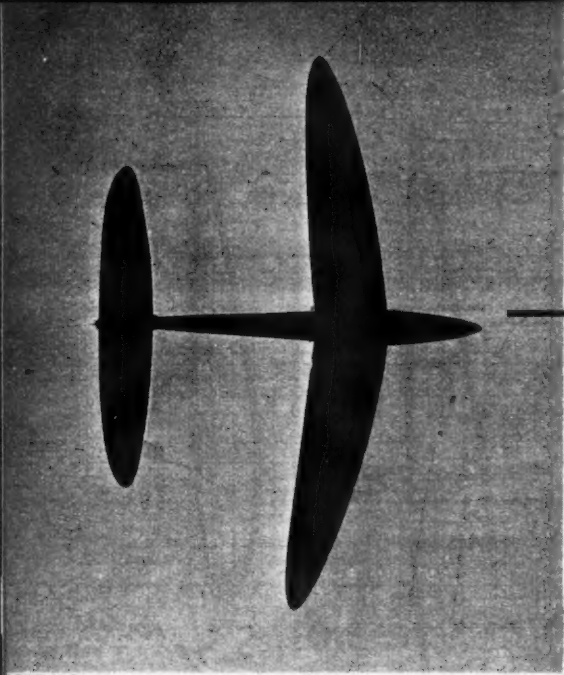
(*Turn to page 95*)


BOOSTER PLUG JACKS
2 REQ.
#2-56 MACH. SCREW
& NUT 4 REQ.
1/4" SQUARES
FUS. REF. LINE
IGNITION SWITCH
#1
#2 5/8
#4 5/16
#6
#7 13/16
#0
#1
#2 5/8
#4 5/16
#6
#7 13/16
#9 5/8
#11
15/32
COIL
BATTERIES
3 R
1/8
1 1/2
A
A
C.G.
CEMENT NUT
TO FRAME
CONDENSER
GAS TANK
#2-56 MACH.
SCREWS
SECT. A-A
SHOWING DETAIL OF
NOSE WHEEL GEAR
ATTACH BLOCKS


STRAP .020 ALUM. SHEET
1 5/8
1 9/16
1 3/16
1/8
1/4
1 7/8
1 7/32
4 3/8
*2-56 SCREW & LOCK NUTS
CEMENT INNER NUT
TO BOX
DETAIL OF BATTERY BOX
1 5/8
23/32
METAL
STRIPS FOR
COWL FASTENING
*2-56 SCREW & NUT
CEMENT NUT TO FWD.
SIDE OF FRAME
OUTLINE OF
FIREWALL
STA *11
STA *12
STA *13
STA *14
STA *14 13/16
*9 5/8
*11
ENGINE COWL. LINES
*13
*14
*14 13/16
℄
ENGINE
BOTTOM OF
FIREWALL
1/8 DIA. HOLE THRU
FIREWALL FOR NEO-
PRENE GAS LINE
1 5/8
11/16
1 3/16
1
1 5/32
3/4
2
2 1/4
1/16 DIA HOLES
GAS TANK DETAILS
FUS. REF. LINE &
℄ OF THRUST
1/2
1 15/16
1/8 R
WRAP WITH WIRE &
SOLDER
1 7/16 DIA.
9/16
1 1/2
3 9/16
DETAILS
OF NOSE GEAR
1/16 DIA. PINS THRU
SIDE COWL & WING
1 3/8
1/2
3/8 R
0
1
2
3
4
5
6
SCALE-1/2 SIZE
DESIGNED BY
O. VAN RENSSELAER
P.W. WESTBURG
MODEL
PV-1
FUSELAGE
ASSEMBLY
PAGE
1


T.E. (FUSELAGE STA.
STA 11/16
STA 3 3/8
SECT. B-
#2-56 MACH. SCREWS & NUTS
D
B
STA. 5 3/4
STA 6 1/4
B
27/32
3/32
LINK
STA 8 9/16
D
SECT. D-D
FUSELAGE REF LINE
2 21/32
STA. 10 7/8
27/32 TO FUS. REF. PLANE
STA. 13 1/4
5 1/4
2 3/8
STA 15 9/16
2
1 3/8
1/8 R
1/16 DIA. HOLE
DETAILS OF ELEVATOR HORN
STA. 17 3/8
1 1/8
6°


SECT. C-C
TO FUS. STA. #0
C
C
DETAILS OF BELL CRANK
DIA. HOLE
COVER PLATE
STA. #11/16
STA. #3 3/8
STA. #5 3/4
STA. #6 1/4
STA. #17 7/8
STA. #15 5/16
STA. #13 1/4
STA. #10 7/8
STA. #8 9/16
THRUST PLANE
DETAIL OF JIG
DETAILS OF LANDING GEAR
ADD WHEEL COVERS FOR APPEARANCE
SCALE 1/2 SIZE
DESIGNED BY O. VAN RENSSELAER
P.W. WESTBURG
MODEL
PV-1
WING & TAIL
ASSEMBLY
PAGE
2



HOOKER

by WALTER J. KLEIN JR.

A glider of clean design that is a sure "hooker" if thermals are present

HERE it is fellows! If you want to win your share of trophies this is the model for you. Simple to build and easy to adjust, yet possessing remarkable flight characteristics, the *Hooker* is the result of over six months of designing and flying. The ship shown here is the best performer in a series of three towline models, turning in flights of 2 and 3 minutes with a hundred foot tow, in even poor weather conditions.

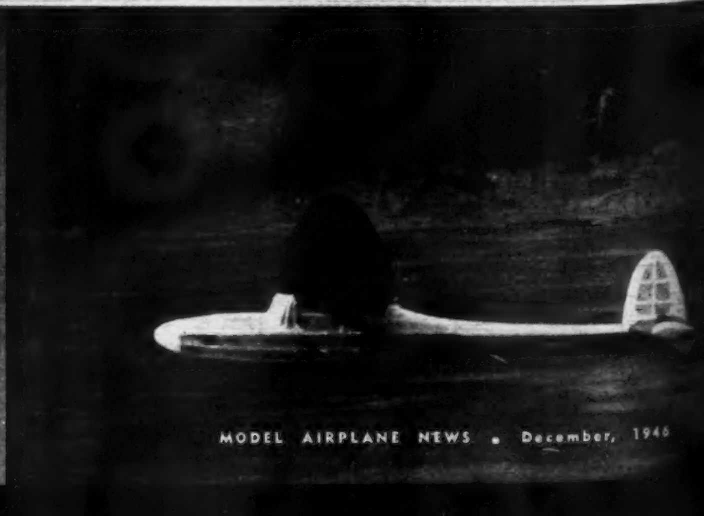
It handles well in the tow and has a very fine glide. It is a swell ship for sport flying and is an ideal job for contest work. Featuring the popular crutch type fuselage, and sparless wing construction, the *Hooker* is very easy to build. Incidentally, several rather new design features have also been incorporated. Among other things a long tail moment was used. This, in conjunction with a short nose moment, approaches gas model design and is a definite departure from standard towline practice. These features provide an extremely stable tow, even in windy weather, and when used with a small stabilizer, allow quick recovery after the tow is completed.

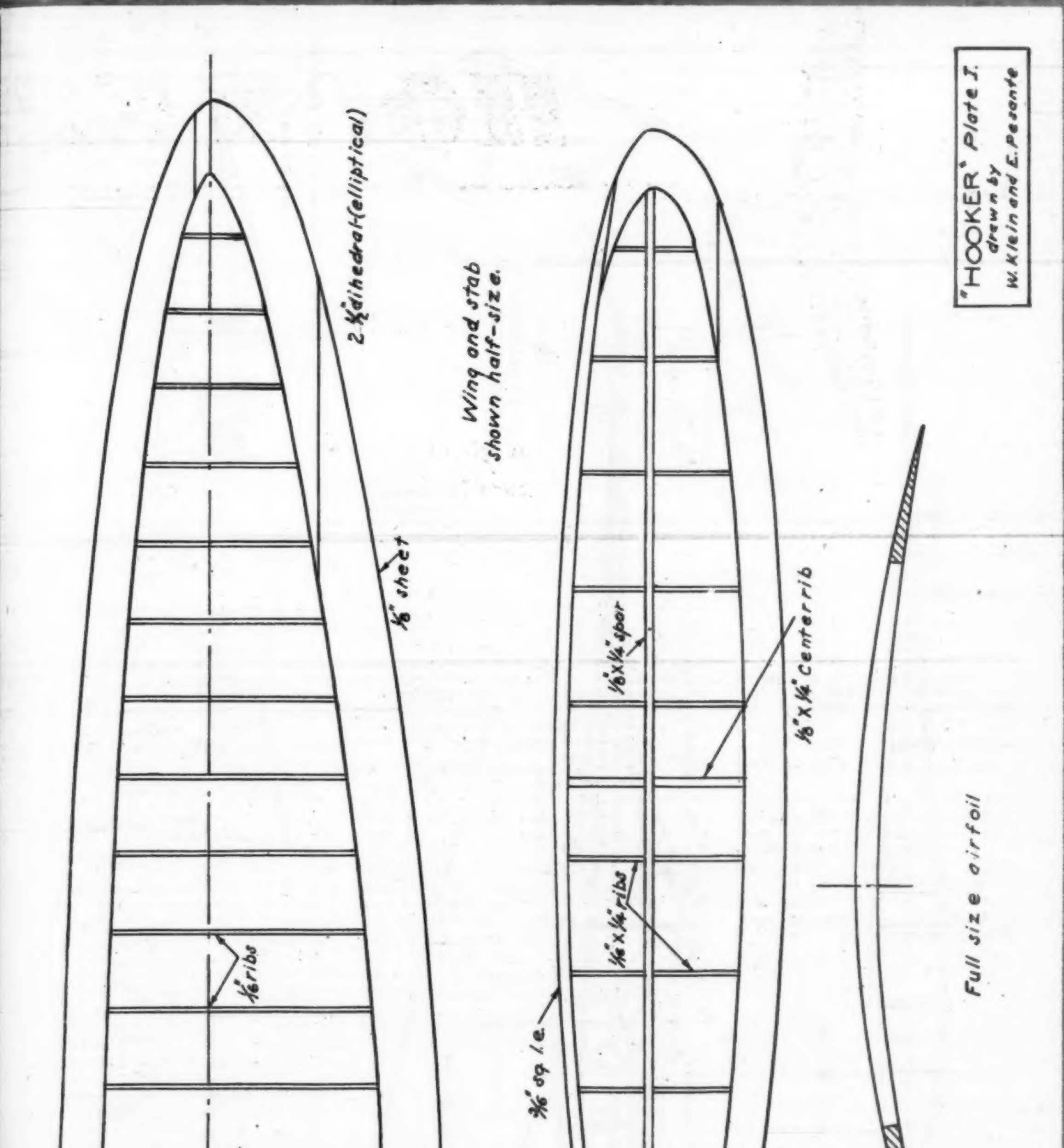
FUSELAGE—For ease and speed in building, crutch construction was chosen for the fuselage. Since all formers are given full size it is only necessary to scale up the top view. Then select two strips of medium hard 3/16" sq. balsa. Pin these in position on the plans and insert the crosspieces. While the crutch is drying, cut out all formers, keels, etc., from 1/8" medium hard balsa. Now cement the top formers, keel and wing platform in place on the crutch. When the whole assembly is dry, remove from bench and add the lower former. Carve the soft balsa noseblock to approximate shape and glue in place, sanding to final shape later. Next, add the 3/32" sq. stringers and the bottom keel of 1/8" sq. At this point the balsa fairing around the cabin may also be attached. Sand the entire structure when dry and set aside for covering. The wing hooks, tow hooks and celluloid windshield may be added after the fuselage is covered and doped.

WING—Before beginning the wing, first enlarge the wing plan which is shown half size. Through experience I have found that the best way of obtaining a true airfoil section with this type construction is to build the wing on some sort of jig. For this purpose, I used several pieces of scrap balsa whose upper surface was shaped the same as the wing undercamber. Pin a few of these balsa wood "jigs" at various spots on the plans and build the wing on top of them. This will preserve just the right amount of camber. Cut out the entire wing outline from 1/8" medium hard balsa. Cement it together and pin on the plan. Next, make a cardboard pattern of the airfoil and carefully cut out the required number of 1/16" sheet ribs. These can be trimmed to the correct length when they are inserted in the wing outline. Be sure to keep the wing centerline lined up with the center marks on the ribs. This will maintain the correct airfoil section throughout.

When both halves of the wing are built, trim the trailing edges and sand the entire structures completely. Join the two sections at the middle, keeping 1-1/2" dihedral beneath each wing tip. After the wing is covered and doped, the correct amount of dihedral will warp itself in. If desired, the center section can be

(Turn to page 68)




"HOOKER" Plate I.
drawn by
W. Klein and L. Pesante
2 1/2" dihedral (elliptical)
Wing and stab
shown half-size.
1/8" sheet
1/16" ribs
1"
3/16" sq. l.e.
1/8" X 1/4" spar
1/8" X 1/4" Center rib
1/16" X 1/4" ribs
Sub rudder
1/16" sheet
Full size airfoil

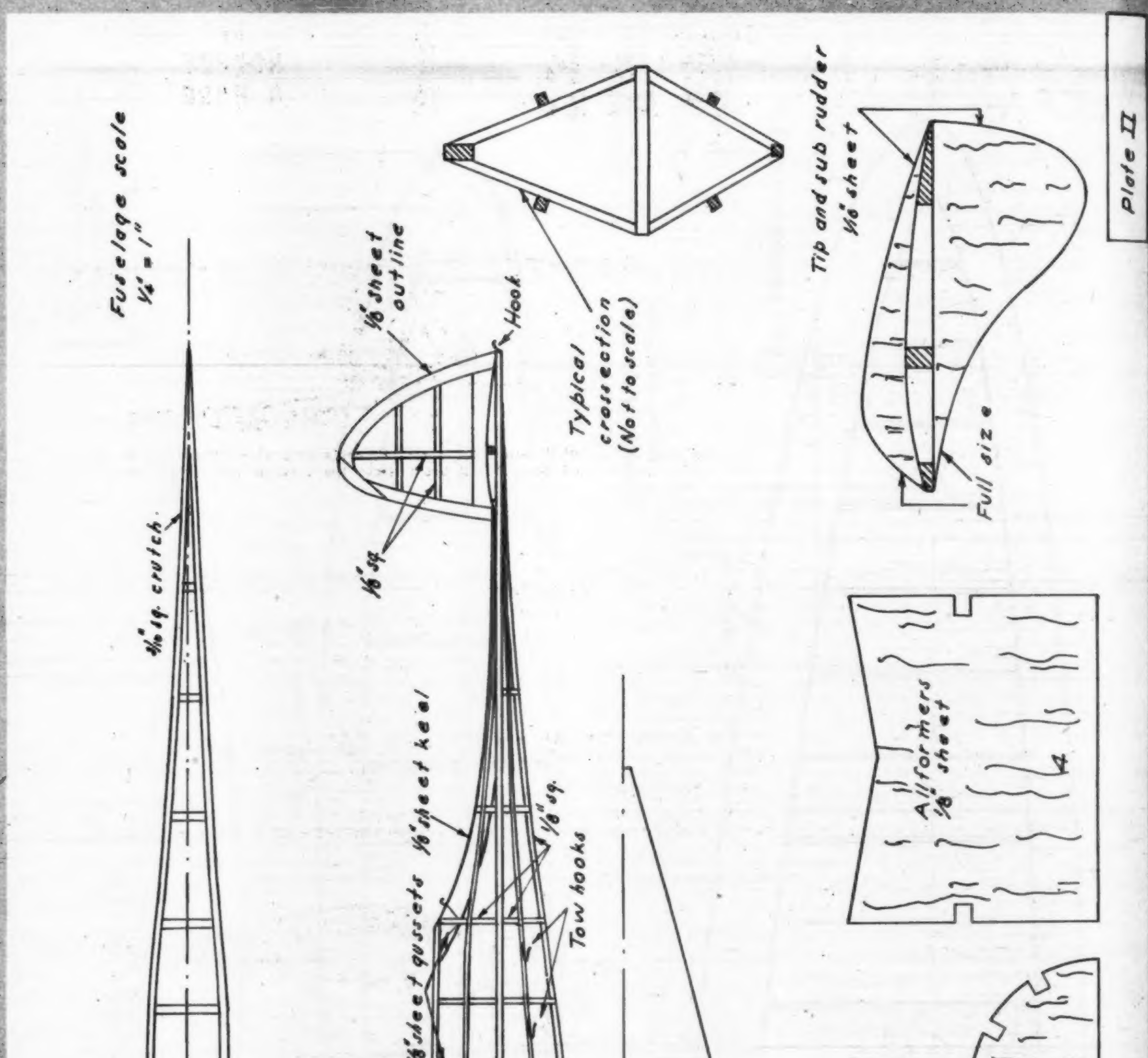
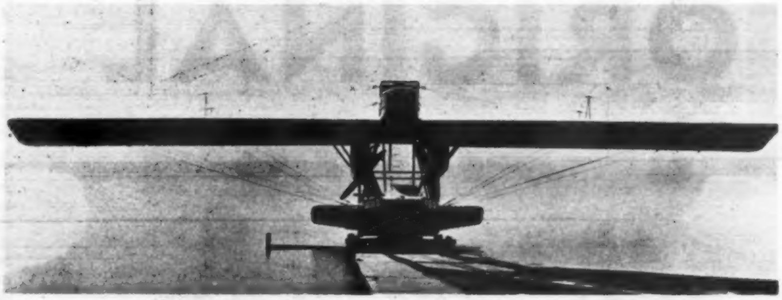


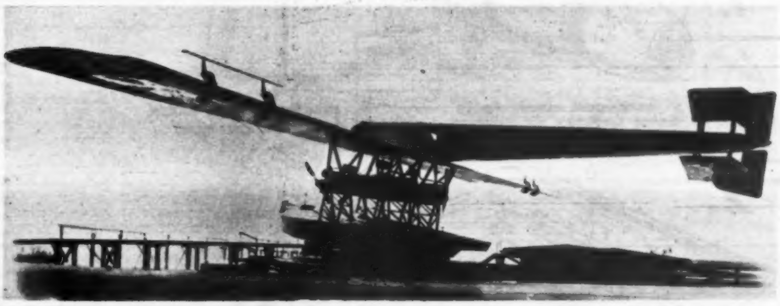
Plate II
Fuselage scale
1/4" = 1"
3/16" sq. crutch
All stringers are 3/32" sq.
1/8" sheet outline
Hook
1/8" sq.
Typical
crossection
(Not to scale)
Tip and sub rudder
1/16" sheet
Full size
1/8" sheet keel
1/8" sq.
Tow hooks
1/8" sheet gussets
3/32" dowel
1/16" sheet
Weight
Balsa
noseblock
Wing platform - 1/8" sheet
All formers
1/8" sheet
Full size formers

WORLD WAR I

by
ROBERT
C. HARE



(Above) Dornier RS.IV with radio operator's cabin atop wing. (Below) RS.III had a biplane tail and covered tail boom. Note the aerodynamic aileron balances



(Below) Huge wing expanse and tandem motors are evident in this taxying RS.III

WORLD WAR I experiments conducted by Claude Dornier in the field of giant metal flying boats were described in part in the October issue of this magazine. At that time it was revealed how this pioneer of the giant airplane developed not only methods of metal framework construction, but successful aerodynamic forms with which to prove his structural theories.

The enthusiasm and confidence with which Dornier plunged into these problems by producing the largest aircraft conceived up to that time (Rs. I) caused many aeronautical heads to wag in doubt. But the lessons he learned, when applied to types Rs.II and Rs.IIa, were sufficient to remain for years as patterns for metal-framed aircraft in all nations.

Stability Problems

Performance of the Rs. IIa attracted the attention of many German aerodynamicists and engineers who began to think that perhaps Dornier had something after all. Among the latter was a highly regarded authority, Dr. Oskar Ursinus, editor of the German aviation journal *Flugsport*. Sometime before the war Ursinus had devoted a great deal of space in his magazine to the problem of control where large multi-motored aircraft were involved.

Dr. Ursinus' greatest concern was the difficulty in overcoming yaw in a big airplane caused by failure of one or more powerplants on one side. This, of course, presumed the usual configuration of tractor or pusher type with a single fuselage, lower wing attached to the bottom and upper wing held above it. Ursinus proposed instead a twin engine drive concentrated as closely as possible to the airplane's center line by attaching the fuselage to the upper wing and having the propeller tips almost touching. A twin engined, three place armed reconnaissance type actually was built to Ursinus' designs at Darmstadt, Germany early in 1914. Later, several large twin float naval patrol planes were built to this formula.

By mounting the engines either in the hull or above it, Dornier had already accomplished the yaw minimizing effect proclaimed by the editor. But Dornier had also built a tremendous amount of drag into his flying boats by retaining the open latticework outriggers in the Rs.II and Rs.IIa. Conferences held between Dornier and Ursinus pointed to the possibility that an enclosed fuselage mounted above the wing would further reduce the assymetrical power control problem by providing lateral fin surface above the center of gravity, and at the same time offer an aerodynamically cleaner member on which to hang the tail surfaces.

The Rs. 111

Accordingly, Dornier completed late in 1916 the Rs.III flying boat which embodied these thoughts. It had a wingspan of 122 ft. 3 in. and was 75 ft. long—somewhat larger than the Rs.II types. Dornier sought, however, greater efficiency in his new boat and although the span was larger the total wing area of 2,430 sq. ft. was somewhat less than the Rs.II. By using a higher aspect ratio it was possible for the Rs.III to operate at a gross weight of 23,550 lbs. Empty weight was 15,850 lbs. With four 260 hp. *Maybach* engines, the Rs.III was loaded at 22.6 lbs. per hp. and the wings at 9.7 lbs. per sq. ft.

The stubby lower wing familiar on the Rs.II was eliminated through superior float design. And, further seeking reduction in drag, Dornier braced the immense Rs.III wings entirely by cables, eliminating all struts except those bearing the engines and connecting the wing with the central float.

Empennage of the Rs.III reverted again to the biplane type suspended with the end of the fuselage between upper and lower horizontal surfaces. Fixed rectangular fins were attached above and below the fuselage, eliminated entirely for some experimental flights. A single aerodynamically balanced rudder divided into upper and lower portions was incorporated. Rudders were cut away in their leading edge to permit movement of the biplane elevators.

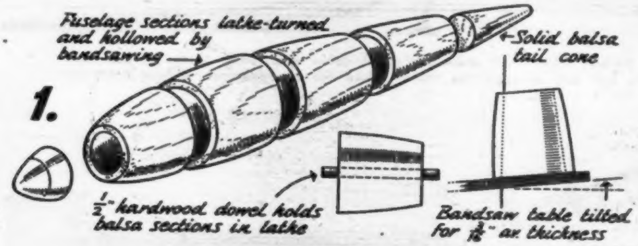
Backbone of the Rs.III was the wing-mounted fuselage. Because of its experimental nature, the fuselage was framed in metal tubes and girders braced with wire. Its covering, except for a metal nose section, was entirely fabric.

(*Turn to page* 84)

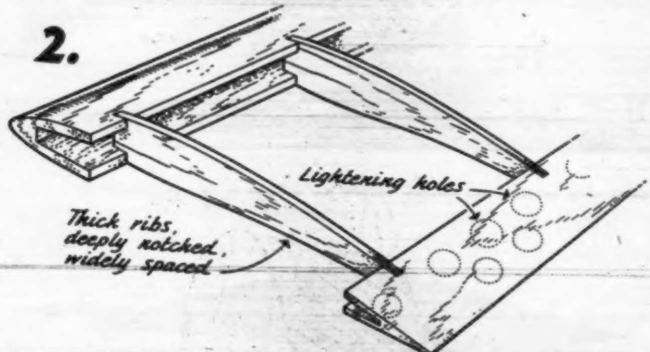
MAKE IT ORIGINAL

by H. A. THOMAS JR.

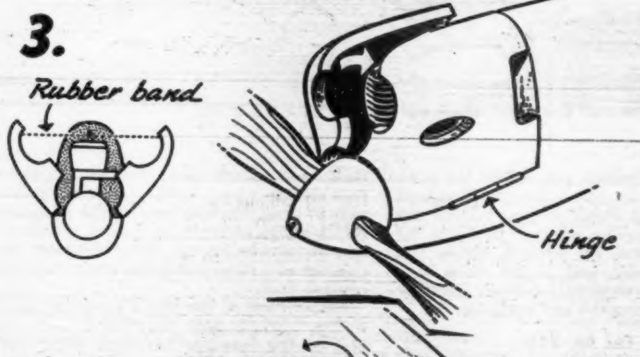
1.



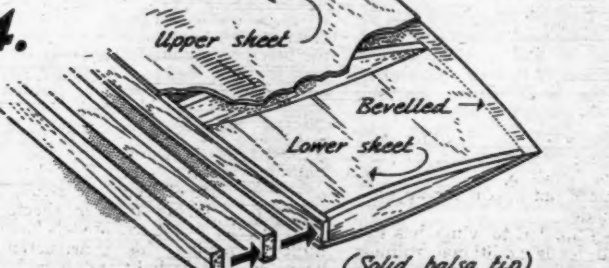
2.



3.



4.



ONE of the most satisfying aspects of the model plane hobby lies in the design and construction of light, strong and efficient structures. Most of us are prone to follow conventional practices too closely; we often follow the line of least resistance and either build strictly from "the plans in the kit" or else follow certain construction methods purely by force of habit. As a result, the same type of wing or fuselage construction appears in our models year after year whereas our broadening experience should reflect progress in the construction of our models.

Sit down with a sketch pad sometime and see what you can dream up in the way of novel construction. Do not aim toward something unusual just to be different but make an effort to lay aside your cut and dried notions in favor of new ideas, regardless of how strange they may seem at the outset. Louis Garami's *Molecule* with bent sheet fuselage; Goldberg's *Zipper*, featuring multiple spar wing and unusual fuselage structure; Leon Shulman's *Banshee* with its original, simplified body design—these are examples to shoot at.

Suggestions in our accompanying sketches are not intended for you to accept outright, rather they are meant to prompt you onto your own original schemes. Model building, you'll find, is more intriguing than ever when the plane you work with incorporates your own ideas in its construction.

Gas model construction, for instance, has a long way to go before achieving anything like the ultimate. The improvements we could list in this phase of modeling alone would be lengthy, but in part they include: 1. Still lighter models with no reduction in strength (extra battery cells for improved ignition and more "beef" in the engine mount and landing gear will get your plane up to the weight rule). 2. Wing and tail structures which are more warp-resisting than most conventional ones. 3. Airfoil surfaces of greater smoothness and uniformity of section. 4. Firmer engine mounts which will not absorb the fuel mixture. 5. More streamlined, shock-absorbing landing gear. 6. Fuselage structures with flush or internally mounted accessories. 7. More efficient and accessible cowlings.

In the field of rubber models—stick and fuselage types, indoor and outdoor—there is an even greater opportunity for advancement though the scarcity of rubber strands in recent years has hindered development of these types.

So give it a whirl, fellows. Whether your interests lie in rubber models, free flight gas or control line, there are a lot of improvements which all model builders could benefit from. You can hit on some of them yourself if you kick over the traces, forget your model building habits and use the old noodle.

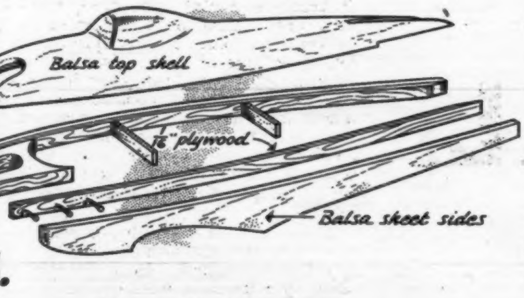
Notes in Reference to Sketches

1. Power tools can be used to advantage in shaping this racing plane fuselage. J. L. Sadler devised this system which has been successfully used. Make a template of the fuselage profile, dividing it into lengths equivalent to the maximum capacity of your bandsaw. Turn these on the lathe to smooth outside contours, tilt the saw table, cut the inside part out and butt-join all sections. Reinforce the seams with fabric bands if necessary, then cut out as needed for engine mount, wing, etc.

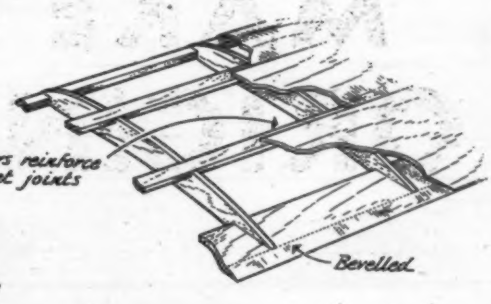
2. A table saw can virtually prefabricate this wing for you. Adjust the table and saw height to cut the wedge-shaped openings for lightening. Taper the trailing edge with the saw, also. Such strong leading and trailing edges will permit spars, leading edge sheathing and/or false ribs to be omitted in this simplified wing structure.

3. Engine cowls are primarily designed

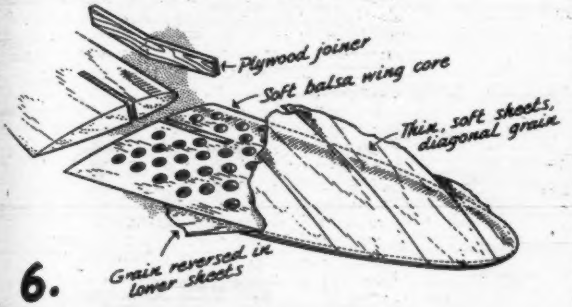
5.



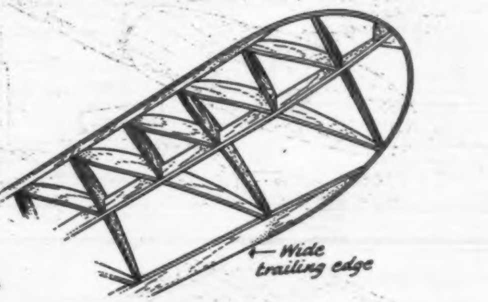
8.



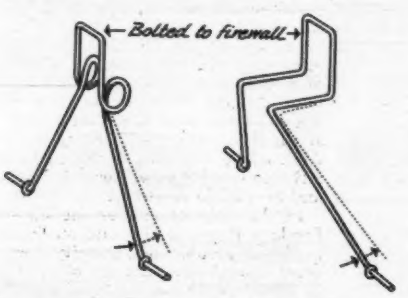
6.



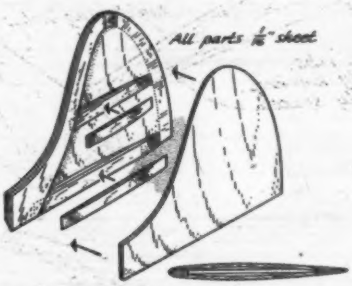
9.



7.



10.



for streamlining and for improving the model's appearance. More scientific cooling—pressure cooling—is another advantage of cowling your engine. This cowl design has what so many lack: accessibility. Hinged, clam-like, and held shut with a rubberband inside, it opens easily for motor adjustments and snaps closed automatically.

4. Most racing wings feature curved edges and this, especially in the case of the leading edge, makes construction difficult. A simple way of doing it is to build the wing with a flat, bent leading edge strip and later bend and cement additional strips to it. Final shaping produces the smooth curved leading edge.

5. Primarily intended for control models, this fuselage structure could also be adapted to free flight low-wing models. Lengthwise plywood strips tie the entire fuselage together. Engine mount is nailed and glued inside and sheet sides are added later. A few cross members, sheet covering for the bottom and a hollowed upper shell complete the fuselage.

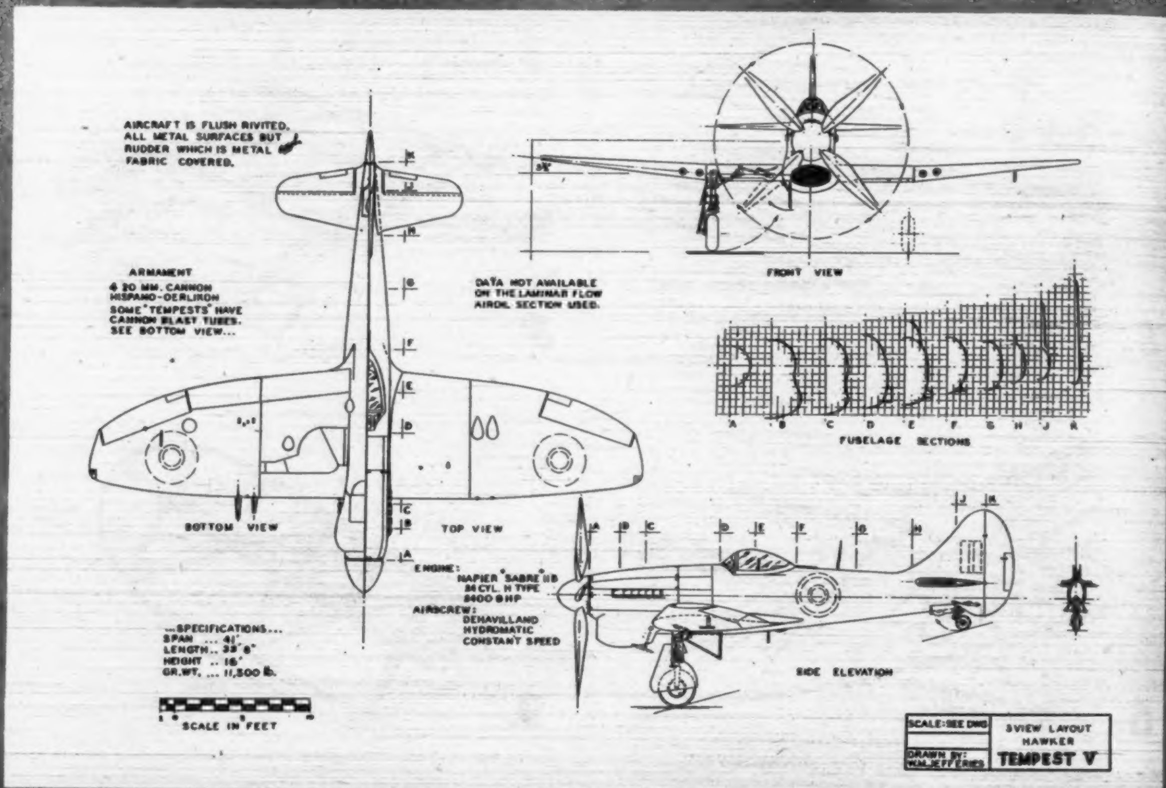
6. Thin racing wings must be strong and light. This one has a dead-soft, perforated core of balsa. Dihedral joint is strengthened with a plywood joiner. Thin, soft balsa sheets are applied wet with grain diagonally to top and bottom surfaces. Final sanding, filling and polishing produces an efficient, tough racing wing.

7. A flexible landing gear can often absorb the shock of a landing which is a near washout. By bending loops or extra angles into the steel wire landing gear struts, still more flexibility can be had. These loops or bends can be inside the fuselage and need not impair the appearance of the model.

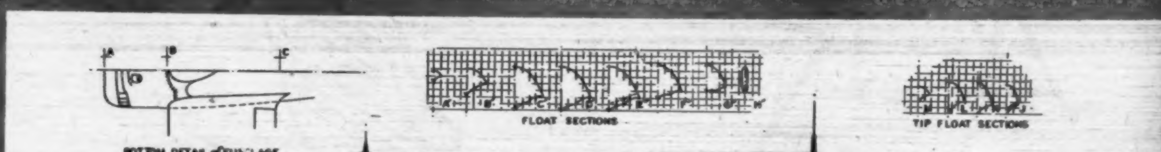
8. Veneering applied to wings has two advantages: it lends additional stiffness and strength to the wing and increases overall efficiency by making the wing section more nearly consistent throughout. Flat spars in the structure shown serve primarily to reinforce the spanwise seams in the sheet covering.

9. This wing frame design for rubber models—or light gas models—is an effort to get around the common tendency of light wings to warp. Hot sunshine plays havoc with weak wings, often warping them to such an extent that the model is thrown completely out of adjustment. Diagonally placed ribs resist this.

10. Control model tail parts made of solid sheet balsa may expedite the construction of a model but it gives little satisfaction to the builder who enjoys built-up construction. The sketch indicates a more efficient and stronger tail structure utilizing thinner sheets with light interior members. Models have been built employing this construction and been found to be light and durable.



AIRCRAFT IS FLUSH RIVITED. ALL METAL SURFACES BUT RUDDER WHICH IS METAL FABRIC COVERED.
ARMAMENT
4 20 MM. CANNON HISPANO-OERLIKON
SOME "TEMPESTS" HAVE CANNON BLAST TUBES. SEE BOTTOM VIEW...
DATA NOT AVAILABLE ON THE LAMINAR FLOW AIRFOIL SECTION USED.
FRONT VIEW
FUSELAGE SECTIONS
BOTTOM VIEW
TOP VIEW
ENGINE: NAPIER "SABRE" IIB 24 CYL. H TYPE 2400 BHP
AIRSCREW: DEHAVILLAND HYDROMATIC CONSTANT SPEED
...SPECIFICATIONS...
SPAN ... 41'
LENGTH... 33' 8"
HEIGHT .. 16'
GR.WT. ... 11,500 lb.
SCALE IN FEET
SIDE ELEVATION
SCALE: SEE DWG
DRAWN BY: WM.JEFFERIES
3 VIEW LAYOUT HAWKER
TEMPEST V



BOTTOM DETAIL of FUSELAGE
FLOAT SECTIONS
TIP FLOAT SECTIONS
WING SECTION at ROOT
FRONT ELEVATION
FUSELAGE SECTIONS
TOP VIEW
BOTTOM VIEW
...NOTE...
PITOT STATIC TUBE
RETRACTABLE LANDING LIGHT MOUNTED ON LEFT WING ONLY.......
ENGINE... WRIGHT "CYCLONE 9"
CURTISS ELECTRIC CONSTANT SPEED STEEL PROPELLER
DATUM LINE
SPAN...... 41'
LENGTH... 36' 5"
SCALE
SIDE ELEVATION
SCALE: SEE DWG
DRAWN BY: WM.JEFFERIES
3 VIEW LAYOUT CURTISS SEAHAWK
SC-1

TABLE NO. 3
COMPARATIVE DATA ON TYPICAL FULLSIZE AND MODEL AIRPLANE ENGINES

	Wright Cyclone 750C9HD	Continental A65-8	Forster "29" (Power with alcohol)	Forster "20" (Power with gasoline)
No. Cyl.	9 Radial	4 Opposed	1 Vertical	
Disp. Cu. In.	1,823.000	171.000	.297	
Engine Weight, Lbs.	1,352.000	175.000	.359	
Weight Per Cu. In. Disp., Lbs.	.742	1.023	1.21	
Takeoff H.P.	1,425.000	75.000	.382	.321
R.P.M.	2,700	2,600	13,100	11,400
H.P. Per Cu. In. Disp.	.782	.438	1.286	1.081
Weight Per H.P., Lbs.	.95	2.33	.94	1.12

Model Motor Symposium

(Continued from page 17)

curves, together with the data in the tables, reveal that manufacturers have been giving further attention to increasing the power efficiency of model engines with some interesting results. Contributing to this high efficiency is the trend towards use of higher compression ratios, in some cases not far below the ratios used in compression-ignition engines. An examination of the data will show that some manufacturers are employing compression ratios ranging from 9 to 1 to as high as 13 to 1.

Improved and more powerful *Forster* 29 and *Super* 99 models are being placed on the market as a result of research work carried out by the manufacturer. The compression ratio of the 29 has been increased from 8 to 1 to 9 to 1. In my last article it was noted that doubt might be expressed regarding the accuracy of the very high specific power outputs claimed by some makers of model engines, namely, over 1 hp per cu. in. of displacement, resulting in weight-to-power ratios in the neighborhood of 1 lb. per hp. It was also noted that at least in one case the high output probably was obtained with alcohol fuel. In view of the foregoing, the horsepower chart of the *Forster* 29 is particularly interesting, for it not only shows the outputs of a modern model engine when operating on alcohol and on gasoline, but also constitutes test data in graphic form from an established manufacturer which indicate that specific outputs and weight-to-power ratios on the order of those named above actually are possible.

Forster tests were carried out with a reaction dynamometer and the engine speeds read with a stroboscope. The compression ratio and valve timing of the engine were standard. The alcohol fuel used was a commercial brand available at hobby stores, and the gasoline fuel consisted of four parts regular gasoline to which one part of S.A.E. No. 60 oil was added. Bare weight of the engine is given as 5¾ oz., and it will be seen that operating on alcohol it developed a maximum of .382 hp at 13,100 rpm, which makes the hp per cu. in. 1.286, and weight per hp .94 lb. Corresponding figures for gasoline operation are: maximum brake hp, .321 at 11,400 rpm; hp per cu. in., 1.081; weight per hp, 1.12 lb.

Power output with the alcohol fuel was thus about 19% higher than with gasoline. A comparison of the performance characteristics of the *Forster* 29 with those of a typical 9 cylinder, four-cycle supercharged radial aircraft engine developing 1425 hp, and a typical 4 cylinder, four-cycle light airplane engine developing 175 hp is shown in table 3. The fig-

(Turn to page 46)

TABLE NO. 4
ANALYSIS OF CONSTRUCTION DATA

	Number of Engines
CYLINDER	
Steel	24
Aluminum Alloy	20
Iron	5
Magnesium Alloy	2
Integral with Crankcase	9
Attached to Crankcase	42
Head Integral	21
Head Attached	29
Not stated	1
CRANKCASE	
Aluminum Alloy	43
Magnesium Alloy	6
Iron	1
Special Alloy	1
PISTON	
Steel	27
Aluminum Alloy	14
Iron	10
CONNECTING ROD	
Aluminum Alloy	36
Steel	7
Bronze	4
Magnesium Alloy	3
Special Alloy	1

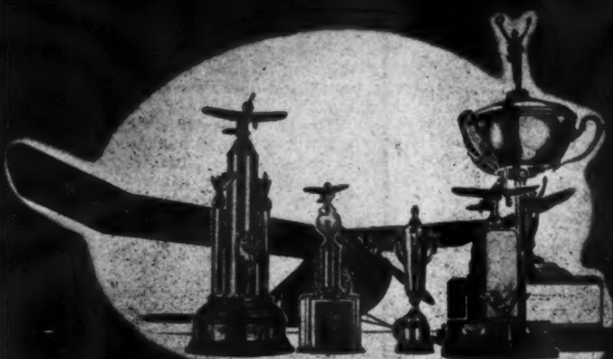
	Number of Engines
CRANKPIN BEARING	
Not Bushed	26
Bushed	23
Not stated	2
WRISTPIN BEARING	
Not Bushed	35
Bushed	13
Not Stated	3
CRANKSHAFT BEARING	
Bushed	34
Ball	10
Not Bushed	6
Not stated	1
CYLINDER PORTS	
Two	21
Three	21
Four	6
Not stated	3
ROTARY VALVE	
Shaft Type	16
Disk Type	7
Special Types	3
Not stated	2
Dual valves	1
Total Rotary Valves	29

MODEL MOTOR SYMPOSIUM—TABLE 1—*Continued from page 18*

	Class	Displacement, Cu. In.	Cylinder	Cylinder Attachment to Crankcase	Cylinder Head	Cylinder Head Attachment to Cylinder	Crankcase	Piston	Connecting Rod	Crankpin Bearing	Wristpin Bearing	Crankshaft Bearing	Number of Cyl. Ports	Crankcase Admission Valve
Howler	C	.604	Alum. Alloy, Iron Alloy Liner	Integral	Alum. Alloy	Bolts	Alum. Alloy	Alum. Alloy, 2 Rings	Dural	Bronze Bushing	Bronze Bushing	2 Ball	3	Rotary for Liquid Fuel
Ken "610"	C	.604	Alum. Alloy, Centrifugal-Cast Iron Liner	Integral	Alum. Alloy	6 Screws	Alum. Alloy	Cast Iron	Alum. Alloy	Bronze Bushing	Bronze Bushing	2 Ball	3	Rotary, Induction Blower
Ohlsson "60"	C	.604	Steel	Spot weld	Steel	Integral	Alum. Alloy, Die Cast	Cast iron	Alum. Alloy	Bronze Bushing	Bronze Bushing	Br. Bushing Ball Thrust	3	
O. K. Super "60"	C	.604	Steel	Screws	Steel	Integral	Alum. Alloy	Steel	Alum. Alloy, Forged	No Bushing	No Bushing	Bronze Bushing	2	Rotary, Shaft-Type
O. K. Special	C	.604	Steel	Screws	Steel	Integral	Alum. Alloy	Steel	Alum. Alloy, Forged	No Bushing	No Bushing	Bronze Bushing	3	
McCoy	C	.607	Alum. 195-T6 Sand Cast, Mee. Liner	Integral	Alum. Alloy, 142	6 Screws	Alum. Alloy, Sand Cast	Alum. Alloy, 142	Alum., 14ST Forged	Alum.-Br. Bushing	Alum.-Br. Bushing	2 Ball	2	Rotary, Disk-Type
O. K. De Luxe	C	.616	Steel	Screws	Steel	Integral	Alum. Alloy	Steel	Alum. Alloy, Forged	No Bushing	No Bushing	Bronze Bushing	3	
Super Champion	C	.624	Steel	3 Through-bolts	Alum. Alloy, Die Cast	6 Bolts	Alum. Alloy Die Cast	Alum. Alloy, 2 Rings	Dural, Forged	No Bushing	No Bushing	Oilite Br. Bushing, Ball Thrust	2	Rotary, Shaft and extra rear
Super Cyclone "G" (Dual Ignition)	C	.647	Alum. Alloy, Die Cast, Steel Liner	Screws	Alum. Alloy	6 Screws	Alum. Alloy	Steel, Alum. Skirt	Alum. Alloy	Bronze Bushing	Bronze Bushing	Br. Bushing Ball Thrust	2	Rotary Shaft-Type
Bond	C	.680	Steel, Alloy	4 Bolts	Alum. Alloy	Screws	Alum. Alloy	Steel, Hardened	Steel Tubing	Bronze Bushing	Bronze Bushing	Br. Bushing Self-Oiling	4	
Molnar	C	.785	Steel, Chrom.-Moly	Threaded	Steel, Chrom-Moly	Bolts	Alum. Alloy, Sand Cast	Steel, Chrom-Moly, 2 Rings	Steel, Tool	Bronze Bushing	No Bushing	Oilite Br. Bushing		Rotary, Shaft-Type
Forster Super "99"	C	.997	Alum. Alloy, Die Cast, Steel Liner	4 Screws	Alum. Alloy, Die Cast	Integral	Alum. Alloy, Die Cast	Alum. Alloy, Lo-ex, 2 Rings	Alum. Alloy	Bronze Bushing	Bronze Bushing	Ball Bearing Thrust and Radial	3	
O. K. "Twin"	C	1.208	Steel	Screws	Steel	Integral	Alum. Alloy	Steel	Alum. Alloy, Forged	No Bushing	No Bushing	Bronze Bushing	3	
Avion Mercury "45"		1.609	Magnesium, Sd. Cast Carbon Steel Liner	Screws	Magnesium Sand Cast	Integral	Magnesium, Dow H HT, Sand Cast	Alloy, 2 Rings	Magnesium, Dow H HT, Sand Cast	Bronze Bushing	Bronze Bushing	2 Ball	3	

Winner of the 1940 A. M. A. National Championship Class "C" Open

The BUZZARD BOMBSHELL *is back!*



Specifications

CLASS C

WING SPAN . 69 inches

LENGTH . . . 51 inches

WING AREA . . .
. . . 796 sq. inches

WEIGHT (with motor)
. . . . 56 ounces

WING LOADING .
7 oz. per 100 sq. inches

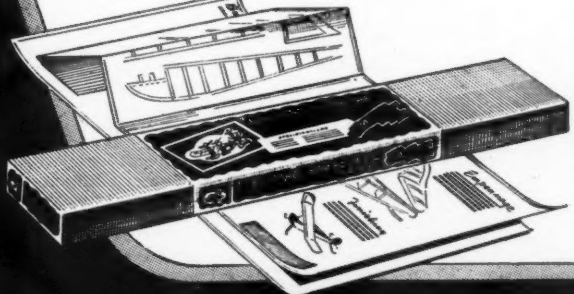
POWER PLANT . .
. . . 60 cu. inches displacement or over

AIRFOIL . . . .
MAIRCRAFT "A"

The famous Buzzard Bombshell is back — improved and modified by MAIRCRAFT into a deluxe, ready to assemble kit.

Packed in an attractive three-color box, the individual Buzzard parts are precision cut to finished shape, even to notches, slots and tricky airfoil sections. Formed landing gear and transparent cabin enclosure are included in the kit, along with four special "stick-tite" decals in three colors and an identification tag.

Two plan sheets 34" x 52" clearly show how to assemble a record winning plane in record time.



$9.95

SOUND ENGINEERING • HONEST VALUES • SINCERE POLICIES

Maircraft INC.
4026 ELSTON AVE.
CHICAGO 18, ILL.

CABLE ADDRESS: CONCORDIA   120 WALL ST., NEW YORK

ures speak for themselves. For example, weight per hp of the Forster operating on alcohol is slightly less than that of the large radial aircraft engine. Operating on gasoline it is slightly greater, but less than half that of the 4-cylinder lightplane engine. Also, the figures for the large engines are based on the takeoff hp, which output only can be maintained for a short time.

The former *Model 29* was provided with an Oilite bronze crankshaft bearing, but in the improved engine radial and thrust loads are taken by a ball bearing.

The latest *Forster 99* has a compression ratio of 8.50 to 1. It differs from *Model 29* in having an aluminum alloy cylinder with steel liner instead of a cylinder turned from alloy steel. A throttle on the carburetor is standard equipment. A two-point "Hi-Low" timing system is standard equipment on the *99* and extra equipment on the *29*.

Built to power airplanes with an 8 to 12-ft. wingspan, including those with radio control, the *Avion Mercury* is a large model engine, the piston displacement of 1.609 cu. in. being the greatest of those engines listed. The cylinder has a bore of 1¼" and a stroke of 1 5/16", the latter being 1/16" longer than in the earlier Avion model.

Rated at .70 hp at 3800 rpm, it is stated this engine develops .75 hp by dynamometer test. It appears from the chart that one dynamometer reading was about .80 hp. An interesting feature of this chart is that the torque curve for the engine also is shown. A propeller having a 20" diameter and 10" pitch is recommended.

The engine is equipped with a patented carburetor designed to provide accurate control from the idling speed of 700 rpm to full throttle operation. The push-pull movement of the throttle arm operates the needle valve and butterfly valve simultaneously, thus regulating the gasoline and air intake and giving graduated speed control.

The *Fleetwind* was described in my last article, but the accompanying hp curve was not then available. The manufacturer states that in order to test this engine it was necessary to build a special dynamometer, which was quite an expensive procedure. I have received several requests for information regarding where a dynamometer suitable for testing model engines can be procured, but know of no company producing such a device, although there would appear to be a market for it. The curve reveals that the Fleetwind develops .41 brake hp at 8600 rpm.

The Bond Research Laboratories promised to send an hp curve but this was not received in time to include herein.

Latest addition to the O.K. line is a Class B engine with .299 cu. in. displacement. It is provided with a shaft-type rotary valve and the general design is similar to other O.K. models, the cylinder being machined from a solid steel billet and provided with a special mounting flange which serves the dual purpose of preventing cylinder distortion and providing a means for attaching the cylinder to the aluminum alloy crankcase. It is a shorter stroke engine than other O.K. models, stroke-bore ratio being .87 to 1.

The Class C *O.K. Special* is a comparatively recent model that resembles in many respects the former *Tornado*. Unlike the latter, the connecting rod is forged from aluminum alloy instead of steel. The one piece hardened-steel

(*Turn to page* 49)

STAR of the NATIONALS
at Wichita, Sept. 1946
DELONG "30"
Class B Winner
DELONG 30
FIRST FREE FLIGHT SENIOR CLASS
FIRST CONTROL LINE SENIOR CLASS
FIRST FREE FLIGHT OPEN CLASS
FIRST CONTROL LINE OPEN CLASS
$19.50
NEW LOW PRICE
Formerly $24.50
SUPER MOTORS, INC. • 2093 E. 19th ST. • CLEVELAND 15, OHIO

WORLD WAR I ENTHUSIASTS

One of the outstanding ships of the First World War was a biplane which is not too well known—the *Ansaldo SVA-5*. Your chance to build a control line model of this snappy Italian biplane fighter will come soon, for plans by Joe Wherry will run in the January 1947 issue MODEL AIRPLANE NEWS

crankshaft has a diameter of ½", and the venturi opening in the rotary valve is over ⅓ the diameter of the cylinder bore. As in the case of the well-known *O.K. Twin*, a ball bearing takes the radial and thrust loads on the crankshaft. Pistons of O.K. engines are made of steel, and are hardened and lapped to the cylinder.

An inherent advantage of the 2-cylinder opposed engine is the excellent mechanical balance that results in greatly reduced engine vibration. Up to now there has been no twin cylinder engine available in the popular .60 cu. in. displacement size. The situation has been met with the introduction of the *Wasp-Twin* by Micro Model Co. Unlike other model engines with more than one cylinder now on the market, the *Wasp-Twin* has a rotary valve. Both ends of the one piece alloy steel crankshaft are supported by bronze-bushed bearings, and the rotary valve is located in the rear bearing. A ball thrust bearing also is used. The crankcase is made in two halves which are lapped to fit. After the removal of 5 screws and the carburetor, the two halves may be separated to permit access to the crankshaft, bearings, connecting rods and pistons.

The turned steel cylinders are permanently attached to the crankcase. The aluminum alloy crankcase, cylinder heads, and connecting rods are made by what is termed the "Intercast System," which is similar to centrifugal casting, and is said to provide the parts with strength comparable to forgings. A sample connecting rod sent to me by the manufacturer for inspection, when dropped on a hard surface, emits a high pitched ring instead of the usual dull sound. The lower bearing cap is cast integral with the rod, the bearing opening being slightly oval. A very small saw is used to sever the cap and face the rod and cap contact surfaces, following which the cap is attached with screws and the bearing surfaces reamed to size. After the rod has been heat treated it is claimed the aluminum alloy becomes a better bearing material than other bearing metals, provided proper lubrication is supplied. Small holes are drilled in the cap and rod to insure maximum lubrication of the bearing. Hardened steel is the material used for the pistons, which are ground to fit. The horsepower developed is estimated to be ½ at 10,000 rpm. It is stated the present compression ratio of 7 to 1 probably will be changed.

The *Arden*, a new make of model engine, possesses a number of distinctive features, one of which for a Class A engine is a crankshaft mounted on two annular ball bearings. An innovation in intake porting is that the fuel mixture is conducted to the combustion chamber through spaces between piston and cylinder wall, the intake ports occupying most of the circumference of the cylinder, as do the exhaust ports above them. A departure from conventional construction also is found in the radial engine mount, which is a flaring cone-shaped continuation of the die cast magnesium alloy crankcase with a lug located on each side. The construction provides for a 360° mounting to the firewall. The cylinder head is turned from aluminum alloy bar stock, and the piston, connecting rod and crankshaft from chrome molybdenum bar steel. Steel parts are heat treated. A hollow crankshaft type rotary valve admits the gas mixture to the crankcase. The engine is also available with a bronze crankshaft bearing in which case the rated hp is slightly lower than that of the

ball bearing engine, namely 1/11 as compared with 1/10 hp, and the bare engine weight is 2.19 oz. as compared with 2.37 oz.

The *Atomic* is a new make of Class C engine with a displacement of 604 cu. in. It is a high speed type, being rated at 3/4 hp at 16,000 rpm, and is provided with the unusually high compression ratio of 13 to 1. Frontier 40-E corrosion-resistant aluminum alloy is used for cylinder and crankcase, which are sand cast in one unit, and for the cylinder head which is attached to the cylinder with six screws. A Meehanite iron cylinder liner is used. Ball bearings take the radial and thrust crankshaft loads. Bronze bushings are provided at both ends of the Dural 24-ST connecting rod. The piston also is made from aluminum alloy. There are six exhaust ports and three upper and three lower bypass ports. A disk-type rotary valve admits gas mixture to the crankcase.

The *Torpedo 29*, another engine with a one piece aluminum alloy cylinder and crankcase, used in connection with a steel liner, is again in production. The piston is made from Meehanite iron and all bearings are bronze-bushed. A dural connecting rod is provided. The compression ratio used is 7 to 1. It is a two port engine with a shaft-type rotary valve, and turns a propeller 11" in diameter 8,000 rpm.

Formerly sold directly from the factory, the improved postwar *Bullet* Class C engine is now being produced in volume by a new manufacturer and sold through dealers. Despite the fact that it is an engine in the low priced field, it includes such features as a die cast magnesium alloy crankcase and connecting rod, a case hardened and ground steel crankshaft which turns in a bronze bushing, and an alloy steel piston which is lapped to the cast iron cylinder. It is a rotary valve engine with .275 cu. in. displacement. The attached fuel tank may be set so the engine can be mounted in any position.

Incorporated in the *Phantom P. 30* is a special system of bypassing which eliminates need for a deflector on the piston head. There are two intake and two exhaust ports, and the shaft-type rotary valve has what is termed a "square opening" to provide a more rapid increase in the port area as the valve opens. Both the cylinder and piston are turned from alloy steel, and the former is provided with a gun metal finish. The crankcase and connecting rod are aluminum alloy die castings, and the crankshaft and lower rod bearings are bronze-bushed.

Again available to model plane builders is the *Husky*, a Class A engine designated as *Model JV*. The cylinder is a permanent mold, sand cored aluminum alloy casting with machined fins and a steel liner pressed in place. Unlike earlier models the head is now an integral part of the cylinder. The aluminum alloy piston is a permanent mold metal cored casting with an opening in the skirt to provide for the passage of gas from crankcase into the lower transfer port. It is lapped into the cylinder, which is bolted to the aluminum alloy crankcase. The crankshaft journal runs in a brass bushing. The carburetor body is an aluminum alloy casting with a machined venturi tube and a spun aluminum alloy gasoline tank. The nickel-silver needle valve has a 5° taper and 72 threads per in., which gives fine adjustment.

Described as a racing engine for model planes, cars and boats, the *McCoy* is a

(*Turn to page 52*)

new Class C offering. Aluminum alloys used in the construction include 195-T6 alloy for the sand cast cylinder and crankcase unit, 14S alloy for the cylinder head, and 14S-T alloy for the forged connecting rod. Upper and lower rod bearings are bushed with aluminum-bronze. Two ball bearings support the crankshaft. It is a two-port engine with a disk-type rotary valve, and is stated to turn a 9" propeller 14,400 rpm.

Refinements have been made in the *Super Champion*, which now has a displacement of .624 cu. in. instead of .603 cu. in. as a result of an increase in cylinder bore. A Lo-ex aluminum piston fitted with two rings is used in place of an iron piston, and also an improved timer which is stated to provide smoother operation. The crankshaft is now equipped with a ball thrust bearing in addition to the Oilite bronze bearing. A feature continued in this engine is the provision of two rotary valves. One of these is of the hollow crankshaft type. The other consists of a separate hollow shaft mounted in a blind hole in the back cover of the crankcase. It is driven by the crankpin and incorporates a "square valve port" which registers with a similar opening in the sleeve. Both valves are fed by a single carburetor. Other design features include a steel cylinder attached to an aluminum alloy crankcase by through-bolts, and a forged aluminum alloy connecting rod.

The Class B *Vivell* is an improved version of the old *Comet* manufactured by a different company. It is a three-port rotary valve engine with a steel cylinder and an aluminum alloy crankcase and connecting rod. The lower rod bearing is bronze-bushed, and the upper bearing turns on a bronze wristpin. A bronze-bushed bearing supports the crankshaft.

The regular *Molnar* Class C engine has .785 cu. in. displacement, but a model with a 1/8" larger bore and a displacement of .994 cu. in. also is built. Steel is used largely in the construction, the cylinder, piston and connecting rod being sand cast from this material. The steel crankshaft turns in an Oilite bronze bearing. A rotary valve is used.

The Junior Motors Co., one of the oldest model engine builders, is again placing the *Brown Junior* Class C engine on the market. It is a four-port with .601 cu. in. displacement. Steel is the material used for the cylinder, piston and connecting rod. The crankcase is an aluminum alloy die casting. A bronze-bushed connecting rod bearing is used. With a compression ratio of 6.5 to 1, this engine is stated to develop .247 brake hp at 7200 rpm.

Improvements in the new *Bantam* have resulted in increased power. It is stated the 1941 *Bantam* turned a 10" high pitch propeller 6400 rpm, while the 1946 model turns the same propeller 7050 rpm. A compression ratio of about 8 to 1 is used, and the engine may be operated on high octane gasoline. Features continued in the present model include a cylinder machined from alloy steel, a magnesium alloy crankcase finished for corrosion resistance, a connecting rod of the same material now bushed with Meehanite iron at the lower end, and a rotary disk valve. The piston is cast from alloy steel by the centrifugal process.

Design trends revealed by the introduction of entirely new engines indicate an increase in the use of ball bearing crankshafts, aluminum alloy cylinders with liners, and aluminum alloy connecting rods. There is some indication that magnesium alloy will be used more extensively in model engines of the future.

Flash News

(*Continued from page* 2)

craft, flying boats, gust loads, structures, stability and control and spin investigations.

AMONG THE PROBLEMS that must be solved by NACA *before* suitable guided missiles can be developed in this country are: roll-stable bodies, fast moving gyro systems (because current ones are far too slow for supersonic speed control), more potent fuels, reduced fuel consumption of the various types of jet engines, "step" rockets which drop away from the missile as their fuel is exhausted, lifting and control surfaces free of vibration, highspeed airfoils with enough lifting ability to make them worthwhile, long range "homing" devices and remote control systems and effective combinations of the various design elements required for a guided missile. Until many of these questions are solved by NACA, the guided-missile "Buck Rogers" age will remain well in the future, irrespective of overly eager publicity by the services.

AIRCRAFT NOISE, the one greatest stumbling block in the nation's airport building program, is now being attacked on a broad front. Objection to locating an airpark in the vicinity of suburban homes by property owners is the most outspoken obstacle retarding expansion of personal aviation, and reduction of lightplane noise is held by government aviation leaders as the most important research project now facing the private flyer. NACA research on noise of lightplane propellers, which constitutes about 90% of total noise of the airplane, has revealed that remarkable reductions are possible through propeller redesign. NACA believes a multi-blade propeller, possibly with as many as 8 blades, using blades of the fan type (such as are used in the home), can be manufactured with the same efficiency as the conventional two-bladed propeller but with a noise level so low as to be virtually inaudible. Such a propeller would require pitch-changing mechanism if takeoff of the airplane is not to be lengthened. The problem is also being studied by Noise Reduction Subcommittee of the Aircraft Industries Association which also believes that a heat pump, compounding, proper exhaust location and other factors can contribute to overall noise level of the airplane.

BRITISH Ministry of Supply canceled the contract for Britain's first supersonic airplane, as it was nearing completion by Miles Aircraft Ltd. Comparable to our own Bell XS-1, the Miles craft was to have been powered by 17,000 hp rocket motors and was designed to attain a speed of 1000 mph. The craft was believed capable of reaching 36,000 feet in 90 seconds. The extremely rapid development of the science of supersonics was believed to have rendered the Miles "winged bullet" obsolete before completion. The same fate is threatening Bell XS-1, although it has been completed and will soon make its first historic test flight. The untimely death of Jack Woolams, Bell test pilot who was groomed for the first flight of a man at the speed of sound, will require a course in supersonic flight technique by "Slick" Goodlin, Bell test pilot now being trained for the flight along with "Tex" Johnson, another Bell test pilot and Bendix Trophy Winner. Two other XS aircraft are also being readied, each incorporating lessons learned since design of the XS-1 was started.

(*Turn to page* 57)

Flash News

(Continued from page 2)

craft, flying boats, gust loads, structures, stability and control and spin investigations.

AMONG THE PROBLEMS that must be solved by NACA *before* suitable guided missiles can be developed in this country are: roll-stable bodies, fast moving gyro systems (because current ones are far too slow for supersonic speed control), more potent fuels, reduced fuel consumption of the various types of jet engines, "step" rockets which drop away from the missile as their fuel is exhausted, lifting and control surfaces free of vibration, highspeed airfoils with enough lifting ability to make them worthwhile, long range "homing" devices and remote control systems and effective combinations of the various design elements required for a guided missile. Until many of these questions are solved by NACA, the guided-missile "Buck Rogers" age will remain well in the future, irrespective of overly eager publicity by the services.

AIRCRAFT NOISE, the one greatest stumbling block in the nation's airport building program, is now being attacked on a broad front. Objection to locating an airpark in the vicinity of suburban homes by property owners is the most outspoken obstacle retarding expansion of personal aviation, and reduction of lightplane noise is held by government aviation leaders as the most important research project now facing the private flyer. NACA research on noise of lightplane propellers, which constitutes about 90% of total noise of the airplane, has revealed that remarkable reductions are possible through propeller redesign. NACA believes a multi-blade propeller, possibly with as many as 8 blades, using blades of the fan type (such as are used in the home), can be manufactured with the same efficiency as the conventional two-bladed propeller but with a noise level so low as to be virtually inaudible. Such a propeller would require pitch-changing mechanism if takeoff of the airplane is not to be lengthened. The problem is also being studied by Noise Reduction Subcommittee of the Aircraft Industries Association which also believes that a heat pump, compounding, proper exhaust location and other factors can contribute to overall noise level of the airplane.

BRITISH Ministry of Supply canceled the contract for Britain's first supersonic airplane, as it was nearing completion by Miles Aircraft Ltd. Comparable to our own Bell XS-1, the Miles craft was to have been powered by 17,000 hp rocket motors and was designed to attain a speed of 1000 mph. The craft was believed capable of reaching 36,000 feet in 90 seconds. The extremely rapid development of the science of supersonics was believed to have rendered the Miles "winged bullet" obsolete before completion. The same fate is threatening Bell XS-1, although it has been completed and will soon make its first historic test flight. The untimely death of Jack Woolams, Bell test pilot who was groomed for the first flight of a man at the speed of sound, will require a course in supersonic flight technique by "Slick" Goodlin, Bell test pilot now being trained for the flight along with "Tex" Johnson, another Bell test pilot and Bendix Trophy Winner. Two other XS aircraft are also being readied, each incorporating lessons learned since design of the XS-1 was started.

(Turn to page 57)

WANTA HAVE SOME FUN?

If so, build a copy of the *Oil-E-Bird* (the 3 in 1 model) which features the all-balsa construction and simple but efficient engineering of the master model designer, *C. H. GRANT*. Plans of this little ship will appear in January 1947 issue of MODEL AIRPLANE NEWS

PRESIDENT TRUMAN will soon receive a new and larger "Sacred Cow" to replace the famous plane used by late F.D.R. The new plane, a Douglas DC-6, is considerably larger and more advanced in design than the earlier DC-4 and contains the very latest in luxury "gadgets" for use by a nation's President.

MERGER OF Consolidated Vultee and Lockheed Aircraft would produce the largest single aviation enterprise in history of aviation and give the new company a backlog of $474,910,000, largest in the business. Observers have been taken completely by surprise at the motion, particularly that Lockheed was to purchase the giant Convair, rather than vice versa. Of considerable interest to the industry is the line of aircraft such a move provides: the largest bomber, the smallest personal plane and a complete range of military and commercial aircraft in between: XB-36, P-80, P-81, PV, XC-99, L-13, 12-place *Saturn*, 40-place Model 240, 48-64-place *Constellation*, 180-place *Constitution* and the 200-300-place Model 37, a staggering array of aviation aircraft equipment. Equally staggering would be the firm name: Lockheed Consolidated Vultee Aircraft Corp.!

THE LONG AWAITED Waco postwar private aircraft will soon be announced and it is certain to be a radical departure from conventional types. The craft is a *Mixmaster* design with propeller in the extreme tail mounted pusher-style. The design is four-place and two-place with additional payload as desired. Waco continued its wartime work until long after V-J Day and, contrary to most other lightplane manufacturers (and big plane builders, too!) did *not* ignore pleas to refrain from the design of commercial postwar models while the war was still on. (Some companies even paid their engineers to develop designs at home during off-hours.) Preliminary drawings indicate, however, that the new Waco will be well worth the wait.

THE FIRST twin-engine helicopter has been revealed by McDonnell Aircraft Corp. Built for the Navy as the XHJD-1, the new design features laterally disposed twin-rotors (as on the Platt-LePage craft) and twin P&W *Wasp Junior* engines out in the booms.

WEATHER BUREAU Chief of Scientific Services Dr. Harry Wexler announces that rockets will soon be used for weather research by the U. S. Government. Dr. Wexler believes high-altitude rockets (100 miles or more) may be able to provide data on pressures which will make possible extremely long range forecasting. The Weather Bureau now believes that, instead of the constant—59° F. temperature above 70,000 ft. used heretofore, there are bands of temperature and pressure above 100,000 ft. which vary from—30° F. to as high as 212° F. in the 260,-000-400,000 ft. band. Such missiles as the "WAC Corporal" will soon be developed to a point where they may be turned over to Weather Bureau for scientific work at these altitudes.

ALTHOUGH IT may disappoint all of those hundreds of engineers and "crackpots" who advanced the idea years and years ago, the Navy has just announced an electrical catapult for landplanes. The device consists of a short runway containing rails for a small trolley car on which the plane is mounted. Between the rails are a series of electromagnets which are excited in rapid succession, thereby "pulling" the car along. As the speed increases the airplane lifts off the car and into the air. The track is 1382

(*Turn to page* 59)

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACTS OF CONGRESS OF AUGUST 24, 1912, AND MARCH 3, 1933

Of MODEL AIRPLANE NEWS published monthly at Mount Morris, Illinois, for October 1, 1946.
County of New York }
State of New York } ss.

Before me, a Notary Public in and for the State and county aforesaid, personally appeared Jay P. Cleveland, who, having been duly sworn according to law, deposes and says that he is the Publisher of the MODEL AIRPLANE NEWS and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, Jay P. Cleveland, 551 Fifth Ave., New York 17; Editor, Howard C. McEntee, 551 Fifth Ave., New York 17; Managing Editor, Joseph M. Mann, 551 Fifth Ave., New York 17.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.) Air Age Inc., 551 Fifth Ave., New York 17, N. Y. Jay P. Cleveland, 551 Fifth Ave., New York 17, N.Y.; Joseph M. Mann, 551 Fifth Ave., New York 17, N.Y.; Jay P. Cleveland and Yvonne Johnson and Hyman R. Friedman as Trustees, under the Last Will and Testament of George C. Johnson for Grace E. Johnson and Yvonne P. Johnson 551 Fifth Ave., New York 17, N.Y.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and that this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

JAY P. CLEVELAND, Publisher.

Sworn to and subscribed by me this 27th day of September, 1946.

AVIS M. HOFFMAN, Notary Public.
[Seal] My commission expires March 30, 1947.

ft. long and contains more than 300,000 electrical steel sheets and 17,000 high-resistance metal bars.

PATENT for a new fuel has been awarded DuPont company which is claimed to obviate the necessity for oxygen, thereby making it possible for use in the stratosphere. The chemical is ammonium nitrate in liquid anhydrous ammonia and the patent states that since it is made basically from ammonia and nitric acid it can be produced synthetically from air and water.

ARMY AIR FORCES recently received a Lockheed XP-80B *Shooting Star*, described as a "special racing version" of the familiar combat model. Although no details of the changes made in the basic design are available, it is certain that a new wing has been installed as the wing shape is the determining factor in the maximum speed of an airplane in the transonic speed zone. It is well known that top speed of the standard P-80A could not be improved through additional power, regardless of the increased quantities, since the wing shape and accompanying shock wave drag prevent the plane from flying any faster. The new Lockheed is undergoing preparations for speed runs over the Muroc range. Present American speed record is 611 mph established by a Republic XP-84 *Thunderjet* over this same course. World's speed record, however, stands at 616 mph. set by Group Capt. E. M. Donaldson RAF in a special Gloster *Meteor*. This record, however, will not stand for long with a new version of the *Meteor* capable of about 650 mph now nearing completion.

IN ONE OF the strangest moves seen throughout the Air Ministry debates in Parliament, British Overseas Airways announced signing of a contract with Boeing for the purchase of 6 *Stratocruiser* transports. The giant craft are scheduled for delivery in fall of 1947 and cost more than one million dollars each. This, at a time when Commons was berating BOAC for the *Constellation* purchase!

THE GIANT Consolidated Vultee XB-36 may become the world's first heaver-than-air landing field with the use of "parasite" fighters in its belly. AAF reveals that the secret McDonnell XP-85 tiny jet fighter is designed for stowage within the spacious bomb bay of the XB-36 and will be launched in mid-air. Plans for experiments involving a "sky hook" such as was used in the famous *Akron* and *Macon* dirigibles are being studied. The McDonnell is reported to have a phenomenal rate-of-climb.

IN ORDER TO expand its study of combustion, particularly the phenomenon of "knock," the Aircraft Engine Research Laboratory of NACA has developed a superspeed camera capable of taking 200,000 frames a second! The camera was created by C. D. Miller, NACA engineer, and is capable of "stopping" an action moving at 4760 mph!

WHAT MAY indicate a coming trend is the announcement that Pratt & Whitney Division of United Aircraft has entered the jet engine field with a "substantial" share of its budget being earmarked for development work. Although P&W will continue reciprocating engine work for at least the next five years, jet engines will occupy a continuously growing share of attention. Wright Aeronautical has not yet announced its plans in this new field. "If you can't beat 'em—join 'em!" seems to apply in the aircraft engine field, too!

Design Forum

(*Continued from page 28*)

mounted at the wingtips. The wing is of laminar flow section with a sharp leading edge that sweeps back to produce a tapered sweptback wing. On the trailing edge of each wing are shown two sections or panels; Mr. Browning does not indicate what they are but we assume that the outer sections are ailerons and the inner sections flaps.

This is an exceptionally good looking airplane and should do its job well provided stability can be maintained. Maximum chord of the wing is greater than on many tailless airplanes and the elevators are comparatively far back from the c.g. which is just to the rear of the pilot's seat in this case. Nevertheless the moment arm is quite short compared with normal airplanes and longitudinal control is bound to be abrupt and critical. If deviation in a longitudinal direction can be kept small this ship will fly well, but recovery will be difficult should displacement be great. In fact it is doubtful if recovery is possible if displacement is extreme.

This condition can be overcome by a considerable reverse curve on the trailing edge which, however, causes drag so that we are bound to get back some of the disadvantage that has been eliminated by cutting off the tail in the first place.

But there is one cure for erratic longitudinal motion in tailless airplanes: a means that has been tested by the author and was submitted to the armed forces during the war in a tailless airplane of special design. It is a spanwise slot of comparatively wide throat located 65% to 70% back of the leading edge. This makes the tailless wing in effect two wings. Forward of the slot is the lifting part of the wing. Rearward of the slot is the negatively disposed trailing edge, which in effect is a negative stabilizer with a span equal to that of the wing. When this slot is used the negative setting of the trailing edge of a tailless plane need not be as great. Consequently the whole wing will have greater efficiency with less drag.

At upper right of Bill Browning's airplane is shown a section of the suggested tailless plane wing with the slot properly located. When a plane equipped with this type of section noses up, air flows into the slot and increases the lift on the trailing edge thereby righting the plane quickly. The larger the angle of attack the greater the righting effect. Readers who are inclined to experiment with tailless models can improve stability of their craft by including this slot in their design.

There is one other jinx in Mr. Browning's design—the rudders. Because they are located only a short distance back of the c.g. their turning effect will be small. Greater control would be obtained if split ailerons were used with no vertical rudders. Turning then could be accomplished by pulling the upper half of the ailerons upward and the lower half downward. In effect this creates an airbrake causing drag on one wingtip. When the right aileron is opened in this manner the plane turns to the right because there is a drag on the right wingtip. Only a slight drag is necessary to turn the ship because the moment arm from c.g. to center of the aileron is large. In spite of the minor defects of Mr. Browning's design we predict that airplanes of the future will have the general appearance of his craft.

Louis L. Bach of Mt. Vernon, N.Y., has

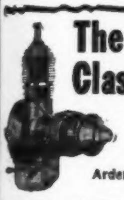
(*Turn to page 62*)

ACE MODEL AIRPLANE CO.

3149 Shenandoah,
St. Louis 4, Mo.

We Have What You Want in Stock, Now! No Delay!

The Nation's Oldest Hobby House at "The Hub of the Universe"
Read the ads in Model Airplane News, then Write or Wire!



The New ARDEN Class "A" MOTOR

$18.50 Postpaid

Less Coil & Condenser
Arden Motor with Ball Bearing, $21.50

It weighs only 2¼ ounces, but it's packed with power that will thrill you, and make your favorite model a "best" performer. .099 cubic inch displacement. Dependable and easy starting. Arden 199 BB. Motor $25.50. Arden Coil $2.50. Arden Condenser 25c.

We Stock ALL Model Motors

Pat Morrissey's ACE Service

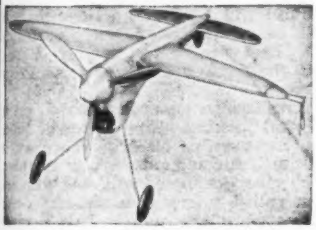
We Carry a Complete Parts Stock

McCOY RACING ENGINE
Fastest Engine in the World

McCOY AIRPLANE MOTOR

$35.00 Postpaid

A NEW model engine built to give you championship performance every flight. Easy starting and easy to control. Less Coil and Condenser.



NEW TOPPING #100 Control Line Sensation
Beautifully contoured aluminum completely preformed for speedy assembly.......$10.00
By mail $10.25

DREMEL MOTO TOOL

#2 Moto Tool complete with chuck and one ⅛ Collet and one emery wheel point only $16.50.

Moto Tool complete with one ⅛ collet, one hardwood case 4 emery wheel points, one dressing stone, 8 carving cutters, 1 saw, 3 bristle brushes, 1 steel brush for cleaning metals, 1 screw mandrel with sanding discs, 1 shoulder mandrel, one ½" drum sander, one 3/32 collet, and one 1/16 collet. Complete only $23.50.

McCOY Racing Car

$42.50
Less Motor
By Mail $42.75

Cast aluminum body, rubber tired wheels, built-in gas tank, ball bearing rear wheels. Correctly balanced, accommodates any engine.

The Super "B"

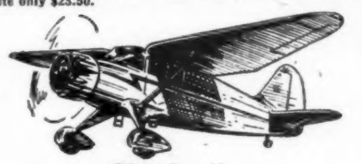
Bore ....11/16"
Stroke ......⅝"
H.P. ....⅙
Displacement .232
Weight (Bare) 5½ oz.

$18.00 with C&C

O.K.

For FREE or Control-Line flight. $21 complete, ready-to-fly.

"OK" 11



Cleveland's 7-FT. "STINSON RELIANT"

Favorite for Radio Control!

Builds up and flies like a real plane. 2" scale. Span 82½ inches. Can carry up to 5 lbs. of equipment. Complete, less motor.......**$15**

Zipper	$5.95	Tarpon	10.75
Whizzer	9.95	Buzz	8.95
G13	7.95	Challenger	9.50
Cyclone	4.95	Cub Trainer	4.95
Fireball	10.00	Strato Streak	2.50
Banshee	6.95	Brigadier 38	1.95
Wanderer	3.50	Runt	2.50
Super Cruiser	10.95	Ercoupe	7.50
Skycycle	7.50	Sailplane	8.95
Hellespont	8.50	Vagabond	5.50
PDQ	5.00	Zomby	3.00
Pacer C	4.95	Ranger	3.00
Playboy Baby, Jr. & Sr. $1, 2.50	4.50	Aero Champ	2.50
Dreamer	7.50	Interceptor	3.95
Strato Cat	5.95	Falcon Speedster	5.45
Strato Kitten	2.95	Baby Miss Behave	2.65
Cliffs Trainer	3.50	Miss Behave	3.95
Tether Streak	3.50	Champion	2.95

Add 25c Postage

Less Coil, Condenser

VIVELL SUPER 35

$18.00

A small Class C motor for Class C or large Class B free flight planes. Ideal for U-control.

Factory Assembled, Block Tested!

ROGERS "29" Class "B"

$15.75 Postpaid

Incl. Coil and Condenser

.292 cu. in. displacement. Wt., 4⅝-oz. May be used inverted. Separate plastic fuel tank. Equipped with rotary valve, dual charge carburetion.

FLEETWIND

$24.75 Postpaid

Incl. Coil and Condenser

Brand new. Class C—.60 cu. in. displacement. Hardened steel cylinder and head; steel piston; twin intakes emulsify gasoline before mixing; twin exhaust ports of special design; long life bearings; new type metal gas tank, capacity 1 oz. Guaranteed for 60 days.

TESTOR C-54

$2.50

Complete with Cement, Finishing Materials, Decals, Propeller Discs, and Mounting Stand

By MAIL **$2.65**

Falcon CADET Stunt Plane

$5.45

Less Motor
By Mail, $5.70

It's the latest by Frank Greene. Light enough for class B motors. Wing span 33 inches, length 24 inches. Duralumin control horn, 100 ft. .012 line, spring steel wire, waterproof firewall, plenty of silk span. Complete kit (dry).

favored us with a very pleasing design for a cabin gas model, Fig. 2. This ship has the general outlines of many well known airplanes, but a model's flying qualities can not always be predicted by the way it looks. Two models with identical proportions will fly entirely differently because of the unseen factors in a model that produce differences in flight; factors such as c.g., angle of the wing and stabilizer and the angle of "downthrust," so called.

Downthrust actually is the angle of the propeller shaft relative to horizontal axis of the fuselage. It has no aerodynamic significance except that it may cause the fuselage to slant down or up at the rear and in so doing provide area below or above the thrust line. In order to properly locate the center of lateral area relative to c.g. Mr. Bach has drawn his thrust line parallel with the stabilizer. The angle of the wing is considerable, approximately 9 degrees as shown; this is obviously too much.

The wing on any gas model seldom should be set at an angle greater than 3° or 4° relative to the stabilizer. If set at more than this, the wing angle of attack in climb will be much greater than the angle of maximum efficiency or highest L/D. Best results are usually obtained when the wings are 3° and the stabilizer is zero.

Bach's design generally is well set up and neat looking. The center of lateral area, however, is slightly above c.g. so that the disturbing axis, AA, or axis about which the airplane will be displaced when rolled sideways is slanting downward toward the nose. This tends to produce instability, because when the plane rolls sideways and banks in a turn it will nose downward. From this position the next step is a spiral dive. The axis in this case, however, is not slanted downward to a great degree so any instability will be slight. Nevertheless the ship would be more stable and would climb in a spiral turn if this axis slanted upward at the nose.

To produce this condition it is not necessary to rebuild your whole airplane. In fact the trouble is easily corrected by giving the plane so called downthrust. This is accomplished by shimming up the rear of the motor so that the axis of the propeller shaft lies along XX in the drawing. Note that this is slightly negative to AA. In other words, axis AA slants up at the nose relative to the thrust line. This will cause the airplane to nose up when it is rolled or banked sideways because normally it flies parallel to the thrust line.

So if you have any airplane that has spiral diving tendencies these can be cured by giving it negative thrust. It is not the negative thrust in itself that eliminates the difficulties but the fact that the c.l.a. actually is lowered relative to the thrust line or, conversely, the thrust line is raised relative to the c.l.a. With negative thrust the airplane will normally fly with tail low. With the thrust line as shown by Mr. Bach, the plane will fly with tail high, approximately in the position shown in the side view.

The c.g. of this airplane, you will note, is slightly above the thrust line. Planes will fly with this set-up but not as well as when the thrust line is above c.g. In normal flight little difference is indicated but when the motor cuts any airplane with c.g. above the thrust line will have greater tendency to nose over into a dive before normal glide takes place—because as soon as the motor cuts, the

(Turn to page 64)

driving force is the inertia of the airplane acting at the center of weight. In this airplane it is above the thrust line so that it will create a nosing-over tendency when the airplane is adjusted for proper flight attitude with power on. When c.g. is below the thrust line the forward pull when the motor cuts will come at a point below the thrust line and farther from the line of resistance. This produces a larger nosing up couple and tends to reduce or overcome diving tendency when the power cuts off. This one factor may save considerable altitude during official contest flights with greater duration resulting. The condition of c.g. being above the thrust line is also corrected when negative thrust is incorporated.

You will note that Mr. Bach has constructed a stabilizer with a cathedral, that is, it turns down instead of up. This increases lifting effect of the stabilizer slightly during the climb. Otherwise it has little advantage (except to reduce lateral stability). By this arrangement longitudinal stability is increased at the expense of lateral stability.

In other respects this gas model is normal, with nicely tapered wing tips, plenty of stabilizer area and sturdy construction of both body and wing.

R. H. Gibbs sends his conception of a Canard Jet Fighter, Fig. 3. In effect his ship has the aspects of a tailless plane with a small elevator at the nose. Mr. Gibbs has given very little detail except the outline of his craft, but happily he has shown considerable genius in its basic design. A plane with this general arrangement would give remarkable performance. All wing surfaces are swept sharply back to overcome compressibility, while power is provided by two jet motors mounted immediately above or at the wing roots.

There are one or two difficulties, though, which make it necessary to modify this design for practical operation. With the motors located as shown, it is difficult to understand how the wing spars can pass into the body and be sufficiently well anchored to withstand tremendous wing stresses. Obviously the motors will have to be either slung below the wing spars or above them. We suggest in this case that the wing be raised so the motors can be slung beneath them.

According to proportions given in the drawing, the c.g. will be located approximately as shown. Keeping this location in mind, look at the side view. You will note that most of the side area is forward of c.g. and it is, therefore, obvious that directionally this plane is quite unstable. It would be impossible for it to hold its course and instead would nose sharply to the right or left and go into tight spins.

A cure for this condition is to extend the body rearward and add a very large fin so that the c.l.a. will be back of the c.g. Then the jet tubes also will have to be extended rearward so that the gases would not burn off the tail of the fuselage. Another way to correct the trouble is to put large vertical fin at or near the sweptback wingtips and extend the center fuselage back but not as far as in the first case. The latter would probably prove to be the best method because jet tubes and fuselage would be shorter.

With surface properly located relative to c.g. this plane undoubtedly would be faster than the speed of sound when equipped with present day jet engines.

Don't forget to send in your designs of models and full scale airplanes to "Design Forum" for analysis. Designs indicating greatest originality and presented in the neatest manner will have priority.

Plane on the Cover

(Continued from page 23)

seat monoplane designed for observation and scouting duties. Final drawings were submitted and approved and the Navy awarded Contract No. 1955 to Edo for the design, designated XOSE-1, signifying an experimental observation-scout.

Contrary to most impressions, a simple straightforward aircraft design is frequently more difficult than a radical superspeed combat plane. Simplicity, economy and serviceability were the keynotes in the design of XOSE-1. Observation duties do not require high speed but rather demand great stability, long endurance and steadiness in the air with the ability to fly slowly almost an asset. Operating a plane from a carrier, with its spacious hangar deck and its astonishingly complete facilities for repair, modification and replacement of parts, is a far different job than operating from a cruiser where a couple of aviation machinist mates and an armorer may be all the "ground crew" available to keep a plane in the air all day, every day.

To meet this demand, Edo called in Harold H. Budds, general manager of Ranger Division, Fairchild Engine and Airplane Corp. The result was a complete power "package" containing a 550 hp Ranger V-770-8 inline air cooled engine, oil tank and system, oil cooler, controls and instrument lines, hinged cowl panels and required lines and fittings all contained in a single unit which may be attached to the airplane by four bolts.

Edo needed no help from any group when it came to designing and producing a rugged float installation: that's been their business for 20 years! As a matter of fact the float, supporting struts and attaching structure is so rugged and can take such rough landings that a special type of "shock absorber" flaps had to be installed to prevent their being knocked out of position by the landing impacts. To accommodate the duties of observation, one of the best vision designs ever laid out was incorporated in XOSE-1 with a large, spacious windshield revealing the sloping, pointed nose of the engine, and a large formed sliding canopy over the cockpit.

To protect the pilot, OSE mounts two .50 cal. machine guns in the wings. Complete radio transmitting and receiving equipment is carried within the fuselage with the antenna suspended between a vertical mast just forward of the windshield and vertical stabilizer. Complete emergency equipment is carried to enable the pilot to remain down on the ocean for more than a week.

That all of this strength and equipment can be contained in an airplane weighing only 5200 lbs. is a tribute to Edo engineering, a "know how" pioneered through two decades of aluminum alloy semimonocoque float construction.

The XOSE-1 has a top speed of over 200 mph and cruises at 130 mph. This is low performance in these days of 600 mph jet planes but ideal for the job of cruising slowly over enemy naval bases and fortifications or fleet formations and reporting what is to be seen to the cruiser or battleship hundreds of miles away. And the OSE can keep this up for six hours, since its endurance at cruising speed, is comparable to many powerful combat planes and twin engine scout planes used during the war. Its primary tactical function is to hover in this manner and report what is observed. Its secondary function is scouting, which requires coverage of a wide area while hunting for enemy fleet or merchant ship

formations. This demands slightly higher performance and different equipment. The Navy draws a careful distinction between these two duties as, for example, the SC-1 which is designed only for scouting work, and the SO3C whose primary duty is scouting and whose observation duties are secondary.

The OSE can climb to 10,000 ft. in 2½ minutes and has an initial rate-of-climb of 1350 feet per minute. It can continue this climb to 21,300 ft., its service ceiling. This altitude is adequate, however, for visual observation work.

Two experimental OSE's have been built and four additional production models are slated for delivery during the year. They will be used for experimental test work and evaluation tests at sea during operations with fleet units.

Hooker

(*Continued from page 34*)

reinforced with silk. In any case be certain to use plenty of cement.

STABILIZER—Cut out the 1/8" sheet balsa outline and cement in place on the plans. Then pin and cement the 3/16" sq. leading edge in its correct location. The spar may now be gently tapered from 1/4" high at the center to 1/8" sq. at the tips. Cement it in place and add all ribs of 1/16" x 1/4" balsa. When the structure is dry, trim to shape and sand well.

RUDDER—Rudder construction is obvious. Merely cut out the 1/8" sheet balsa outline and add the 1/8" sq. balsa crosspieces. Sand well after it is completely dry.

COVERING—On the original ship the fuselage was covered with orange silkspan, and wing and tail were covered with blue Jap tissue. Whatever kind of covering you use, be careful and do a neat job. Apply three light coats of dope, being sure to dope the top of the wing first. Color dope trimming may be added if desired.

FLYING—Select a fairly calm day for test flying the *Hooker*. Make certain the model balances about 2/3 back on the wing. Hand glide the model a few times. If it stalls, add some weight to the nose. If it shows a tendency to dive, take off weight. In case of extremes one way or the other, use incidence in the stabilizer. After you are satisfied with the glide you can attempt to tow the ship. Use the front towhook at first. Later on, however, when the model is adjusted always use the rear hook, even when a strong wind is blowing. This is contrary to general practice but I have achieved excellent results that way and can recommend it to you.

Use about 100 feet of line and slowly tow her up. Be careful not to run too fast at first. Notice the model's turning tendencies, etc. Adjust for a tight left turn in the glide if the tow hooks are located on the left side also. Remember, use care when adjusting your ship and the *Hooker* will reward you with many hours of contest-winning flights. Good luck!

BILL OF MATERIALS

1 sheet	1/16" x 2" balsa
2 sheets	1/8" x 2" balsa
3 pieces	1/8" x 1/8" balsa
5 pieces	3/32" x 3/32" balsa
1 piece	1" x 1 1/2" balsa block
1 piece	1/8" x 1/4" balsa
2 pieces	1/16" x 1/4" balsa
3 pieces	3/16" x 3/16" balsa
1 sheet	silkspan
3 sheets	Jap tissue
1 small sheet	thin celluloid
1 short length	.039 wire

Cement, dope, 1/8" dowel, pins, etc.


Merry Christmas from Phantom
FOR A "MODEL" Christmas
$14.95
COMPLETE WITH COIL, CONDENSER, GAS TANK, SPINNER
P-30 SPECIFICATIONS
DISPLACEMENT .295 cu. in.
BORE .715 in.
STROKE .750 in.
HORSEPOWER 1/5
RATED CLASS "B" UNDER NAA RULES
Dear Modelers:
We have built your Phantom P-30 just the way you wanted it! We designed it RIGHT . . . we built it carefully with the very finest materials and we even have it in a box READY FOR SHIPMENT . . . So you see, YOUR PHANTOM P-30 is waiting for you. Only your address is missing . . . Fill out the coupon below and we will have it there BEFORE CHRISTMAS . . .
Phantom
SPECIAL GIFT COUPON
PHANTOM MOTORS DISTRIBUTING CO.
806 East Gage Avenue, Dept. B-12, Los Angeles 1, Calif.
For a real CHRISTMAS for my________. Send me a new PHANTOM P-30
☐ COMPLETE WITH COIL, CONDENSER, GAS TANK & SPINNER, $14.95
☐ COMPLETE WITH COIL, CONDENSER, GAS TANK & FLYWHEEL, $15.95
☐ FLYWHEEL ONLY, $1.85 (NOTE: Postage prepaid on CASH orders.)
☐ Money Order Enclosed ☐ Send C. O. D.
NAME________
ADDRESS________
CITY________ ZONE____ STATE____
Add 3% if in California. Prices slightly higher in Foreign Countries
ARMY E NAVY
Manufactured by AUTOMATIC SCREW MACHINE COMPANY

Air Ways

(Continued from page 27)

The second place radio control winner, W. G. Siegfried, made two flights, the first of which ended when he lost control of the ship. The site of the radio event was on the western side of Wichita Municipal Airport, the latter a pretty busy field. When control was lost, the motor cut to idling speed and the big model made a perfect landing on one of the main cement strips of the Wichita Airport from which it was safely retrieved a short time later. Can you picture the control tower operator as a strange single-engine plane landed, without his permission, in the middle of his busy airport?

The main workroom of the Wichita Forum was, as may well be imagined, somewhat of a madhouse most of the time. Among other disturbing noises frequently heard were numerous terrific explosions, which startled and mystified the laboring modelers. Although the source was not definitely established, investigators laid these sounds variously to (1) members of the contest committee blowing their tops; (2) disintegration of the motors of certain California "hot fuel" advocates; (3) snapping of overwound synthetic "rubber" motors following those famous last words, "Go ahead, Joe, give 'er another hundred turns"; (4) some of the more violent "change the rules" advocates gunning for Al Lewis.

One feature of Wichita many visitors discovered with surprise is that when a traffic light turns red it definitely means STOP. Several of the model gang found this out the hard way (by a trip to police headquarters), and one Eastern Leader

Frank Davis of San Diego holds *Sailplane* with which he won MODEL AIRPLANE NEWS Trophy for Class C Open Gas event at Nationals. Johnny Davis (no relation), M.A.N. West Coast columnist, congratulates Frank on his other wins with this ship at the same meet which included titles for High Point Winner—All Gas Events, Highest Individual Flight Time, and National Novice Champion

Member won questionable fame by spending the night in the jug after being picked up for jay-walking by representatives of "The Friendly Department." He had forgotten to carry his draft card!

Despite the extremes of weather experienced, the Kansas sun was plenty hot much of the time, and the lines awaiting their turn to buy soft drinks were usually long. Most of the soft drink stands were well conducted, but one served a paper cup full of ice with only a dash of coke for a dime, leading the boys to figure the drinks at this particular stand at about 30c per bottle. This unhappy situation came to the attention of "June" Pierce.

(Turn to page 72)

POLK'S *Proudly Present* *the* WESTERNER

CHAMPION of CHAMPIONS

Designed by Don Foote, peer of all West Coast modelers, winner of more 1st, 2nd and 3rd place trophies ever won by any other model, the WESTERNER emerges from the proving ground of actual contest competition, covering a period of years, in a packaged kit that retains *all* the design characteristics of the prototype, handmade originals.

For beginner or advanced modeler, the WESTERNER gives you the *finest flying gas model yet produced.* If you've never built a model before, or have built dozens, you owe yourself the thrill of flying and the pride of ownership you'll get when *your* WESTERNER takes to the blue.

Start building your Westerner NOW.
Start by mailing your order TODAY.

CLASS 'A' WING SPAN 50½" $3.50
CLASS 'B' WING SPAN 61" $4.50
CLASS 'C' WING SPAN 86" $5.95
(Add 25c package - postage)

YOU GET THESE:

BUILDING INSTRUCTIONS

A 12-page, 5 x 7 inch booklet with "Planform" photographs, isometric and perspective drawings illustrating the 11 basic steps in the construction.

FLYING INSTRUCTIONS

A 12-page, cleverly illustrated booklet that gives you Don Foot's personal instructions in preliminary adjustments.

START *NOW* for a HAPPY "HOBBY" HOLIDAY!

JEM CONTROL HANDLE

The operating principle of the new Jem Control is so radically different from any other on the market that it is difficult to explain in small space. As a control-line flyer, you owe it to yourself, and your plane, at least TRY the handle at your first opportunity. Made "hefty" on purpose, it functions entirely different than any handle you've ever used. Complete instructions furnished **$3.95**

DUARA-PLANE

Made of tough laminated plastic, this control-line flyer has a wing span of 26". Takes a large 'B' or standard 'C' motor. Batteries, accessories & motor mount on a quick removable bracket............$12.50
(Add 25c pp)

DOOLING RACE CAR

The finest in race car design and workmanship. Ball bearing unit, Two-piece magnesium body. Price complete **$45.00**

DUROLYT PLANE

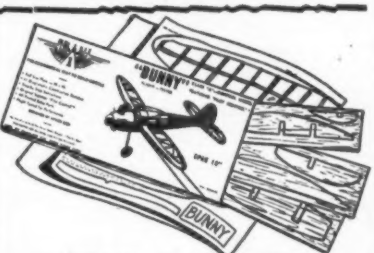
Features lightweight, molded-laminated construction. For control-line flying in Class B-C. Span 27". Completely finished wing, formed metal motor-mount. Fuselage molded to finished shape............$14.95

McCOY RACER

Famous tear-drop race car. Holds cable track record of 112.84 mph. Complete car, less motor........$42.50

McCOY GAS ENGINE

Power plant especially designed for use in the McCoy race car. $35 less coil & condenser.



NEW! PLAN KIT

Eureka! . . . At last a new idea in PLANE PLANS. Now, packaged in envelope form, you can get construction plans for building a newly-designed Class 'B' control-line gas flyer. AND ALL THE PRINTED BALSA MATERIAL. No dope, no sandpaper, no knives. Printed balsa sheets and 34 x 45 inch illustrated plan with 11 diagramatic sketches to build the "BUNNY," a new Class A, 19 inch wing span flyer designed by Avrum Zier, noted author and model engineer. Includes new "Pilot Control" joy-stick functioning of control mechanism.

PLAN KIT NO. 1..............................**$1.25**

MOTORS

THE ATOM GAS ENGINE

Still unsurpassed by any Class A engine, the ATOM is again available to thousands who have patiently waited for its postwar return to production. ORDER YOURS NOW. **$15.50** (Less c. & c.)

FEATURES

Dis.	.099
Bore	½ in.
Stroke	½ in.
Weight	1¾ oz.

MERLIN SUPER B	$18.00
OHLSSON 23--Class B	16.50
OHLSSON 60--Class C	18.50
OK SUPER 60--Class C*	21.00
OK TWIN--Class C*	55.00
McCOY--Class C	35.00

* With coil & condenser

PT MOSQUITO BOAT

Builds a 12½" model of this most famous of all Navy craft. Has carved wood hull, printed wood parts, full size plans.....**$2.50**
(Add 15c pp)

U. S. JEEP & GUN

Scaled ½ in. Versatile Army Jeep with famous 37-mm. anti-aircraft gun. Kit only **79c**

ANTIAIR GUN

People just don't believe you can make such a realistic model from this completely detailed kit! Outriggers, wheels, guns all operate! **$2.95**
(Add 25c pp)

POLK'S CATALOGS

Illustrated, pocket-size buying-building guides.

SOLID MODEL AIRPLANES
64 pages, shows all makes solid models, including famous ARISTCRAFT finished, plastic planes. **15c**

POLK'S SHIPYARD
160 pages, crammed with pictures. Lists hundreds of historical & modern models. (With 35c refund coupon) **35c**

ZOOMER

CLASS B-C GAS FLYER

Engineered for the ultimate in "rate of climb", yet incorporating a "spiral-resistant" design-factor heretofore unapproached by any similar model! The brand-new, in-production ZOOMER provides an entirely new thrill for the model enthusiast who demands maximum flight performance!

COMPLETE KIT, less motor..........................**$6.95**

FOR YOUR LIBRARY

ENGLISH BOOKS

ABC OF MODEL AIRCRAFT CONSTRUCTION 80 pages. Fully illustrated	$1.75
AERODYNAMICS ANALYZED 64 pages. Technical	1.00
AIRCRAFT OF THE FIGHTING POWERS 1st World War. 84 pages	3.50
Volume 3 and 5. Each	9.00
AIRSCREWS 64 pages. Technical	1.00
CAMOUFLAGE 80 pages. World War I	1.50
DESIGN & CONSTRUCTION OF FLYING MODELS 256 pages. Filled with data	4.75
DESIGN OF WAKEFIELD MODELS 64 pages. Technical	1.00
McGILLICUDDY'S YEAR BOOK 112 pages. Air Corp jokes	1.50
NOMOGRAPHS 24 pages. Design charts	1.00
PRACTICAL DESIGN 64 pages. On flying models	1.00
SIMPLE AERODYNAMICS 128 pages. Theory & practical	1.50
SPOTTERS ALBUM Photographs of pre-war planes	2.00
SOLID SCALE MODELS 80 pages. Filled with photos	1.75

ENGLISH PLANS

Working plans for building replicas of famous planes. 24 planes to set.

SERIES 1—BRITISH
SERIES 2—AMERICAN
SERIES 3—GERMAN
} each $2.00

MEMBER MODEL INDUSTRY ASSOCIATION AMERICA

POLK'S MODEL-CRAFT HOBBIES

The World's Leading Hobby House

DEPT. MA-12, 314 FIFTH AVENUE, NEW YORK CITY 1

DEALERS
For purchasing economies and speedy deliveries, all you need is POLK'S.

CHICAGO TERMINAL
(Wholesale Only)
235 S. WABASH AVENUE
Midwest's Largest Display Room

NEW YORK TERMINAL
314 FIFTH AVENUE

chief judge of the radio control event, who immediately put on a loud and successful campaign over the public address system and won the thanks of all concerned when the price of drinks dropped sharply to more reasonable levels.

Well, the above are just a few of the incidents and personalities that will be remembered by those who attended the meet, and it is to such experiences that the conversation always turns when a group of those who were there gather to talk things over.

* *

Because of the great amount of interest shown in the 1946 Nationals, we are devoting half of this department to additional pictures supplementing those printed in our November issue.

Picture No. 1 shows Chuck Hollinger of Seattle, Wash. launching his triple-float job. As may be seen from this view, Chuck waded right into the pond in order to get his model away from the weeds, which were troublesome at the waterside. In later launchings he went in even deeper than we show here.

No. 2 shows Tex Russell of Fort Worth, Texas with his first place winner in the Best Finish event. As can easily be seen, this model, aside from its prize winning finish, is of a very interesting and radical design.

Interest in special flying types ran quite high at the Nationals, there being many helicopters in both the indoor and outdoor classes. The open event helicopter winner, H. P. Schoenky of Kirkwood, Mo. may be seen in No. 3, holding his helicopter and the trophy it won for him.

Sweepstakes winners in the Western Open contest, held a week before the Nationals, were awarded trips to Wichita gratis in the Ohlsson & Rice airplanes. No. 4 shows these lucky modelers with some of their ships and just a few of the trophies they carried back with them. Irwin Ohlsson and Harry Rice, sponsors of the trip, are shown in the door of the fuselage.

No. 5 depicts a scene that was undoubtedly repeated each night and in practically every hotel in Wichita during the four days of the meet. These busy modelers stayed up most of every night readying their ships for the next day's flying. The builders shown here are, from left to right: Ced Galloway of Burbank; J. C. Yates, Burbank; Keith Storey, Pasadena; Don Newberger, Long Beach; M.A.N. Western Editorial representative Johnny Davis of Hollywood; and Wally Wallick of Burbank.

No. 6, sent to us by Bill Bibichkow of Chicago, shows Ed Lidgard holding what seems to be an ornithopter while Wally Fromm puts on those last few turns. This model appears to be a canard but we do not know if this is correct or not.

James M. Wade, "Maebert," Albert Rd., Sligo, Ireland, a contestant in the important Irish "Nationals" held near Dublin in June sent us No. 7, a picture of Mrs. Wade with his entry, a Wakefield model. Flown with disappointing results in the meet due to the impossibility of achieving proper balance, the Wakefield has now been properly trimmed and with 900 turns it does an average of 3½ min. in still air and has a nice circle with torque. Mr. Wade uses no downthrust, no offsetting of any of the surfaces, and attributes excellent flying performance to a "just right" adjustment of the fin area. This method, Mr. Wade believes, precludes bad flights. He gives credit for this tip to C. H. Grant's *Theory of Flight* which "has helped me more than anything else dur-

(*Turn to page 74*)

EAGLE PROUDLY PRESENTS

Once in a blue moon you find a kit that has everything. This is it! Navion is one of the smartest looking, best flying jobs you've ever seen. Speed, maneuverability, rugged construction and a newly developed ignition-track system for rapid disassembly mark Navion for special popularity. Pre-formed .032 plastic canopy, formed tricycle landing gear, job selected wood, complete hardware, including specially developed cowling locks, plywood firewall, 1 pair 2½" streamlite wheels, 1 - 2 inch streamlite nose wheel, complete authentic decals, liquids, photo-viz plans for easy construction — A DELUXE KIT AT A STANDARD MODEL PRICE!

NAVION

Kit Complete Less Motor
$6.50

34" wing span class "A", "B" or .35 displacement "C" engine

WITH FLIGHT CONTROLLER*

*Patented

DESIGNED BY WALT SCHRODER

Internationally famous for authentic scale-liners, Walt has produced the "dream kit" in Navion. 1" x 1' absolute scale with the strongest weight to strength ratio ever developed in a scale-liner.

PLANE FACTS

FEATURING IGNITION TRACK SYSTEM

Exclusively Eagle's, this sensational new mounting permits rapid removal of engine and cowling from fuselage. A quarter turn of the locking device permits removal of the entire assembly-engine, coil, condenser and cowl. Locks rigidly in place.

An EAGLE Product

EAGLE MODEL AIRCRAFT CO., INC.

257 Water Street, Brooklyn 1, N. Y. · Dept. Man-12 · Cable Address: EAGLEHOBBY

Give M. A. N. This Christmas . . . See Page 3!

ing my 20 years of model building."

Here is a description of Mr. Wade's Wakefield: Length (overall)—37"; wingspan—45"; area—205 sq. in.; section—Grant X-8; yellow pine laminated airscrew—17" dia.; fuselage—double covered *Superlite* grey bamboo tissue; 48' rubber, 1/4" flat x 1/30" arranged in 12 strands, rope tensioned.

No. 8 is the contribution of Wolf Rosenthal, Apartado 70, Guatemala City, Guatemala, Central America. His ship, Elmer Powell's *Dragonfly*, was built from August 1946 M.A.N. plans and is a very dependable performer with many one-mile flights to its credit. On the debit side is one crackup which occurred when Mr. Rosenthal launched his ship into a strong breeze with a twist in the wrong direction.

The well-built model in No. 9 was constructed by Austin Meissner, 131 Salisbury Ave., Garden City, N.Y. who adds to the features of an original design with a skid for landing purposes in place of conventional wheel landing gear. Austin claims superiority of the skid, with its lightness, strength, streamlining, propeller protection and landing qualities. At half throttle this free flight gas job is an admirable sport flyer, making flight after flight with little shock and no damage on landing. With full throttle it has a fast and almost vertical climb that has combined with a slow flat glide to give several one minute flights on a 10 sec. motor run. Powered by an *Atom* motor the model has a wingspread of 44" and a wing area of 235 sq. in., weighing in at 10.7 oz.

An old Cleveland Cee-Dee kit and recently M.A.N.—published Wylam Masterplans were combined to produce the D.H.4 1/2" scale model in No. 10, the pride and joy of Donald Hoff, 525 W. 57th St., Los Angeles 37, Calif. The Masterplans-contributed details include movable controls, shock absorbing tail-skid, rotating *Scarff* mount and flexible guns. Spoke wheels were built up from balsa and bamboo slivers. Donald accounts for the missing prop with the explanation that his ship was in the last stages of construction when the picture was taken.

J. L. McLarty's *Ohlsson* 23 powered control liner graces our No. 11 spot and features a very unusual type of elevator control, a profile fuselage and a striking paint job. Control is obtained by use of a solenoid (moving core magnet) which can be seen near the rear of the fuselage. A 22 1/2 volt battery supplies power through No. 28 insulated control wires (visible in pic, protruding from wing tip) to the solenoid.

Mr. McLarty tried supplying voltage for the ignition coil in the same manner but the necessary high voltage required, because of the No. 28 wire, arced badly at the timber points. The profile fuselage was constructed of 1/16" bass sheet with balsa core, making the engine, other installations and repairs very easy to accomplish. Mr. McLarty is a Canadian resident—Box 505, Fort Erie, Ontario.

No. 12 is a rather amazing comparison of sizes, the hand dimensions dwarfing those of the minute 1/144" scale Gee Bee *Super Sportster*, the painstaking work of E. White, 8 Alpine Ave., Tolworth, Surrey, England. The *Sportster's* span is just over the 2 in. mark; building involved two months of spare time.

NEWS OF MODELERS

Elmer Schaller, 3096 Blakely Dr., San Diego 10, Calif. hails the return of World War I plans to model magazines in a let-

(Turn to page 77)

WESTERN DEALERS

FAST ★ WHOLESALE ★ SERVICE

Leading Lines of Modelmakers' Supplies, Including

ATWOOD, AIR-O, AERO-SPARK, AIR AGE BOOKS, AIR-AUTO-MARINE, AIR-FLO, ALL-STAR, ARISTOCRAFT, AMECO, AMERICAN JR., AUSTIN-CRAFT, BEACON, BANTAM, AEROGLOSS, CONSOLIDATED, CANNON, CHUPP, C & R, DELONG, DAVIES, DOOLING, CONTESTOR, CADET, CAPITOL, CHAMPION PLUGS, EAGLE, EDCO, E-V, FALCON, FLO-TORQUE, FROOM, GIRARD, HORNET, HERKIMER, HECO, HURRICANE, JASCO, McCOY, MELCRAFT, MEGOW, MONARCH, POWER-PLUS, RAY, MINIJET, SCIENTIFIC, SNAFU, SULLIVAN, TESTOR, TOPPING, TORPEDO, VIVELL, X-ACTO AND MANY OTHERS

Send for Large Wholesale Lists

"HOBBYCRAFTS"

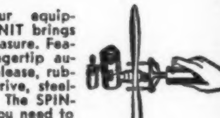
DISTRIBUTORS

1327 J ST. SACRAMENTO 14, CALIF.

The GAS MODEL STARTER

SPINIT

It's Super!



Completing your equipment with a SPINIT brings added flying pleasure. Features include fingertip automatic safety release, rubber cushioned drive, steel-spring powered. The SPINIT is *just* what you need to make model flying more fun.

IF IT WILL RUN, A SPINIT WILL START IT

More fun, more thrills—with a SPINIT. Standard for A & B motors. Heavy for C motors. Two blade models, short or long drive, $4.00; 3 blade models, $6.00. Write for folder. Order from dealer or direct.

STREED ELECTRIC CO.
1315 Harmon Place, Dept. M
Minneapolis 3, Minnesota

CAMBER CUT WINGS

ONLY 30c 18" SPAN

NOT THIS OR THIS BUT THIS

Only the Vanguard Meteor gives you a completely finished wing for better glider flights. Pod, boom and tail also finished for quicker, easier assembly.

VANGUARD **METEOR**

ROSEBUD
Special model for beginners. All parts finished. 18" span. An extra special value at only 15c.

SOLID SOARER
World's largest 25c glider. All parts cut to shape. Span is 24".

FLYING WING
18" span. All parts cut out. Plane of the future. Glides fine.

WIN A CASH PRIZE

Best Meteor flight in an official club contest each month wins $10.00. Second best flight $5.00. Have Contest Director certify your flight then write us giving contest date and flight time.

See your dealer today. Order direct only if he is out. Add 10c postage for each kit.

VANGUARD models
113 SHELDON EL SEGUNDO, CAL.

D E A L E R S

36" Balsa Per 100
- 1/16 x 1/16 ....$ .25
- 1/16 x 1/8 ..... .35
- 1/16 x 3/16 .... .50
- 1/16 x 1/4 ..... .60
- 1/16 x 1/2 ..... .85
- 3/32 x 3/32 .... .35
- 1/8 x 1/8 ..... .45
- 1/8 x 3/16 .... .70
- 1/8 x 1/4 ..... .95
- 1/8 x 3/8 ..... 1.35
- 1/8 x 1/2 ..... 1.85
- 1/8 x 1 .... 2.50
- 3/16 x 3/16 .... 1.00
- 1/4 x 1/4 ..... 1.50
- 1/4 x 1/2 ..... 2.50
- 1/2 x 1/2 ..... 4.00
- 1/2 x 1 .... 6.00
- 1 x 1 .... 10.00
- 1 x 1 1/2 ..... 17.00

NOSE BLOCKS Net
- 1 x 2 x 1"—20 ..$ .15
- 2 x 2 x 1"—20 .. .25
- 3 x 3 x 1"—10 .. .35
- 3 x 3 x 2"—10 .. .50
- Neoprene 1/8 Rubber ... Ft. .01
- *1/16 x 1/16 x 6 Dowels .... .25
- *Trust Bearings Small .... .75
- *(per 100)
- *Trust Bearings Large 1.20
- White Tissue Dz. .15
- Bamboo Paper Dz.. 60
- Red - White - Blue - Green - Yellow

- 1/8 Brass Washers—100 ..... .10
- 1/4 Brass Washers—100 ..... .20
- Ball Bearing Washers small and large. Dz. .75
- Prop. Hinges Dz. 1.10
- Prop. Shafts Med. ..... 100 .80
- Rear Hooks ..... .70
- Art. Brushes Dz. .80
- Sm. Bushings 100 .25
- Free Wheelings dz. .75

36" Balsa Per 100
- 1/64 x 2 x 18 ...$1.75
- 1/32 x 2 x 36 ... 2.50
- 1/16 x 2 x 36 ... 3.50
- 3/32 x 2 x 36 ... 4.00
- 1/8 x 2 x 36 ... 4.60
- 3/16 x 2 x 36 ... 5.50
- 1/4 x 2 x 36 ... 7.00
- 1/2 x 2 x 36 ...11.00
- 3/8 x 2 x 36 ... 9.00

Shredded Bamboo
- 1/32 Sq. x 12". dz. Packs 35c

WHEELS per 100

	Balsa	Birch	Celu.
1/2"	$.90	$.60	....
3/4"	1.20	.90	...-
1"	1.50	1.20	3.00
1 3/8	2.40	1.50	4.50
1 7/8	3.00	2.10	6.00
2"	4.50	4.50	....

BALSA PLANKS
- 1x2x36 Per 100 .$[illegible]
- 2 x 2 x 36 Per 10 4.00
- 2 x 3 x 36 Per 10 5.00
- 2 x 4 x 36 Per 10 7.50
- 2 x 6 x 36 Per 5. 5.00

Balsa Props
- 5" .... doz. $.36
- 6" .... doz. .43
- 7" .... doz. .50
- 8" .... doz. .58
- 9" .... doz. .65
- 10" .... doz. .72
- 12" .... doz. .87

GAS MODEL PROPS
- 8" to 14" ......$ .30
- Dozen 3.00
- Neoprene Gas line 10 ft. ... 1.00
- Cement-Clear, Dope-Col. Dope 1/2 oz. Bots., Dz. Net .. 78c
- In colored dope we have all colors.
- 1/2 Pts. Cement—C. Dope Dz. 3.60
- 1 Gal. Cement or Dope 2.80
- 1 Gal. Colored Dope 3.80
- 5 Gal. Colored Dope 15.00
- 5 Gal. Cement or Dope 10.80
- 1/2 Pts., Col. Dope dz. 4.80

All prices are net. All goods shipped Express collect.
M.O. OR CHECK WITH ORDER

RELIABLE DEALERS SUPPLY
10 West Camden St., Dept. M12, Hackensack, N.J.

UNCLE BROTHER
AUNT SISTER
GRANDMA NEPHEW
GRANDPA NIECE
FATHER SON
MOTHER DAUGHTER

WHAT one GIFT WOULD PLEASE THEM ALL?

No matter what their tastes . . . their hobbies . . . their likes or dislikes . . . there's one gift that will please them, each and every one. That gift is a UNITED STATES SAVINGS BOND. This Christmas, put at least one Savings Bond under the tree for someone you love!

$5.00

No postage required

Brings you this new Stunt & Speed Plane

FEATURING

- *spinner
- *wheels & tail wheel
- *metal motor mounts
- *ready cut hardwood and plywood
- *pre-cut balsa tail, cowl, wing-tips and rudder.
- *full size plans.

The "KNIGHT-MARE" For Class B & C

DOVER MODEL MANUFACTURES

BOX 91 BOONTON, NEW JERSEY

Dealers write for discounts and circular

AT LAST!!

A complete non-technical method of adjusting rubber powered models and hand launched gliders for contest winning flights.

Secrets Of

Flying Model Aircraft

The Best Built Models do not always win contests. Learn the real secrets of contest winning performance, explained in language you can understand.

This booklet explains in detail, with the help of simple sketches, how to adjust and fly: Fuselage and Stick Models • Indoor and Outdoor Hand Launched Gliders • Towline Gliders • Flying Scale.

SEND ONLY 50c TO

IMPERIAL

MODEL AIRCRAFT CO.
Box 5151 - Oklahoma City, Okla.

ter to "News of Modelers." He proves the popularity of Wylam's First War three views with the statement that in the San Diego area "W.W. 1 fans are crawling everywhere" and he urges modelers who are tired of the sleek designs of the new jobs to get to work on constructing these old but interesting crates.

L/Cpl. Thornley, L.H., 14880143, c/o Emslie, 15 Cambridge Gardens, Edinburgh 6, Scotland, a model fan who is still in the service, is very anxious to arrange a swap of M.A.N. copies for current issues of *The Aeromodeller*, an English publication, with an American correspondent. Cpl. Thornley tells us that "we 'over here' are very interested in you 'over there' where aeromodelling is concerned."

A Wakefields duration model and sailplane fan, J. D. Worsdale, 10 Burnnab Rd., Southend-on-Sea, Essex, England, would like to correspond with a modeler of similar interests with whom he can exchange magazines, plans, etc.

E. Morris Swedlund, 402 South Chase Ave., Walla Walla, Wash., writes: "Should any of M.A.N.'s readers run into a 'lost' model answering the following description, please have them contact me:

"Diamond fuselage—silk covered, colored yellow.

"Powered by Forster 29—motor number 859.

"Wingsan 58", 470 sq. in.—colored white on top with blue leading edge, A.M.A. insignia No. 1189 on right panel, all red double tissue covering on bottom of wing."

With 16 years of model building experience behind him, E. Shillito, 45 Beechwood Ave., Flanshaw Park, Wakefield, Yorks, England wants "Club News" help in establishing correspondence with an American modeler of his age (30). Mr. Shillito has been secretary of the local model club for 10 years and at present he and his fellow club members are going all out for round-the-pole indoor flying.

Fernando J. Rueda, San Luis 394, Posadas—Midiones, Rep. Argentina, S.A. writes us of the rubber scarcity and prohibitive cost of gas motors, with the resultant popularity of gliders. Mr. Rueda is interested in writing to a glider fan in the Los Angeles vicinity.

Kenneth F. Jones, 11 Landrock Rd., Hornsey N. 8, London, England, is an unorthodox and experimental flying devotee who would like to exchange ideas and books on his pet subject with an American modeler of similar interests. Kenneth is 18 and secretary of a London model club.

T. M. Figueira, 56, Ariapita Ave., Woodbrook, Port-of-Spain, Trinidad, B.W.I. certainly deserves a modeler's "E" for his successful pioneering in the West Indies, where sources of supply are practically non-existent. In Mr. Figueira's own words: "First of all materials are as scarce as hen's teeth. There are none of those kits which we see advertised in your magazine, and which just make us lick our chops, to be had in the stores. No sir! Every last stringer which goes into a model job has to be cut from the raw wood—logs procured from the forest, trimmed to shape and then sanded to its final proportions. The local wood which we use is a very light soft wood closely resembling balsa. Few of the small group of modelers out here have ever even *seen* anything more than pictures of a gas engine, so everybody builds rubber jobs and then throws them on the shelf because there is no suitable rubber to fly them! Naturally under such primitive

(*Turn to page* 79)

(See Page 31)

conditions modelers are few, hence there are no clubs, no governing body and *never* any competitions, except one half-hearted try about two years ago. I got my start in model flying when I tried to build a model described in an old issue of M.A.N."

CLUB NEWS

California

Leonard Zagortz, Jr., announces the recent election of the following *Barstow Prop Busters* officers: Dick Hartwick, Pres.; George Smith, Vice Pres.; Johnny Dolph, Secy.; Leonard Zagortz, Jr., Treas.; Jack Belsher, Jr., Club Adviser; Fred Gibson, Asst. Adviser.

THE model division of the San Francisco Recreation Department reports its doings via the Department's monthly bulletin, *The Third Dimension*. September's issue scheduled a definite date for the 20th Annual Model Aircraft Tournament—Oct. 13—and gave contest results for August in the following events:

Joe Raspante of New Hyde Park, N.Y., who won the Radio Control model event at the *Mirror* Model Flying Fair, Sept. 29, receives the MODEL AIRPLANE NEWS trophy from Ted Clodius (right), *Mirror* representative

Class A Hand Launched Stick—Micro Division—1. Frank Pagano, 2. Ronald Shrewbrige, 3. Gale Stromberg.

Junior Division—1. Aurilla Doerner, 2. David Rivera, 3. Larry Giordanengo.

Class A Hand Launched Pusher-Micro Division—1. Frank Pagano, 2. Jack Ward, 3. Jack Ritner.

Junior Division—1. Aurilla Doerner, 2. Doug Smith, 3. Larry Giordanengo.

E.B.A.A. members are still recalling with chagrin their night flying jamboree on Aug. 16. Fortifying their ships with lights, the fellows launched them into far-from-favorable winds and watched the crackup total mount. Charlie Hubbard, Don Foote, Dick Verba, Russ Watkins, Ed Body and Gene Hildeman were the owners of the ill-fated accident "victims." One member, Jack Jacoby who possessed at one point the only ship in flying shape, saw his model hit a thermal and go off into the void, lights and all.

SECRETARY Gordon Porter does a reporting job for his club, the *San Luis Modeleers* of San Luis Obispo. 18 active members comprise the *Modeleers*, one of the newer California model organizations, having been formed in June 1946. Officers are: Bill Rains, Pres.; Paul Skidmore, Vice Pres.; Gordon Porter, Secy.; Lawrence Wright, Treas. Meetings are held every other Monday evening at 7:30 at the TNT Hobby Shop, 751 Marsh St., San Luis Obispo, Cal. Free flight and U-control model fans are welcome to come in and place their names on the club roster.

HERE is Northern California's calendar of U-control contest dates:

Oct. 20—Berkeley Jr. Chamber of Commerce.

Nov. 17—Palo Alto.
Dec. 15—South San Francisco (rain date Dec. 22).

Minnesota

The *Piston Pushers* formed in May 1946 to promote U-control activities in St. Paul. The *Pushers* have staged several successful meets since then; a more recent event consisting of dog fighting and four-in-circle flying placed the following members on the winners' list: Roger Sorensen, Jerry Steffen, Jerry Facha, and Don Sektnan.

A *MINNEAPOLIS* group, the *Minneapolis Model Aero Club*, engaged in a busy flying season, holding two large meets and small weekly contests. At a June meet a national record in senior Class C Gas Free Flight was established by a member, Fred Ellsworth. Of unusual interest is the club specialty, "dawn meets," held Sundays at 5 a.m., complete with refreshments.

Michigan

A club in Monroe turns up with an unusual name, the *Monroe Knights of the Dope Bucket*. Bill Covert reports that some members are flying speed jobs and he expects the "record breaking" gleams in their eyes will soon bear fruit.

New Jersey

At a special meeting in September the *Atlantic City Cloud Chasers* elected their officers for the coming year: Thomas Wrigley, Pres.; Matt Gruen, Vice Pres.; John Manning, Secy.; Tom McCullough, Treas. The *Chasers* are planning a big indoor U-control meet and are making every effort to secure Atlantic City's famed Convention Hall for the site.

New York

The *Yonkers Gas Birds* have appointed a new secretary, George Kern, upon the resignation of John S. Elmo. George will hold this office until January, 1947. The club is now accepting new members from the metropolitan area and Westchester county and all interested modelers should contact George at 210 East 85th St., New York 28.

Ohio

Important news in the Cleveland area is the formation of the *Cleveland Council of Model Aeronautics*, a combination of all model clubs for coordination of activities, securing of new flying fields, creation of more interest in the hobby and the staging of bigger and better contests. Organization of the Council became a necessary measure when, after the war, the number of clubs grew to a point where each was operating independently and sometimes at cross purposes. The new group is a council of separate clubs, *not* a merger of all clubs into one.

Temporary officers are: Leo B. Dixon, *Collinwood Controliners*, Chairman; Elmer Shapiro, *Cleveland Balsa Butchers*, Vice Chairman; Tom Bodnar, *East Side American Airlines Gas Model Club*, Treas.; Carl Siesko, *Airfoilers*, Secy. Directors include the officers and Henry Selzer, *American Airlines Gas Model Club Alumni;* H. H. Woods, *Cleveland Balsa Butchers;* Louis Torno, *American Airlines Gas Model Club;* and two others yet to be elected. Publicity committee chairman is H. D. McCall, *American Airlines Gas Model Club*.

In addition to the clubs mentioned above, the following attended organizational meetings: *Gas Guzzlers, Prop Pals, Aeroleers* and *Cleveland Controliners.* John "Red" Hillegas, *Cleveland Balsa Butchers*, Northern Ohio A.M.A. Contest

(*Turn to page 82*)

A powerhouse-full of pleasure...
The finest gift in Santa's bag

Supercharged THUNDERBIRD

The only model engine with a Genuine Supercharger

CLASS "C"

Thundering out of the western skies is the mightiest miniature engine on the market—an engine with a genuine supercharger just like the "big ones"! Yes, the SUPERCHARGED THUNDERBIRD is the only model engine with an independent Supercharger Impeller*

The SUPERCHARGED THUNDERBIRD packs a wallop of extra power because the supercharger impeller forces a denser gas mixture into the combustion chamber and thus increases in efficiency as the r.p.m.'s increase, unlike engines without a supercharger. The SUPERCHARGED THUNDERBIRD starts easier... performs more smoothly... develops greater speed.

Engineered by experts in bigtime aviation, the SUPERCHARGED THUNDERBIRD is the super-special Christmas gift for the model enthusiast you wish to remember.

*Patent pending

- **Spark and mixture controls on rear of engine for easier operation without risk of injury from propeller.**
- **Two ball bearings on crankshaft, and piston rings on a low "X" aluminum piston.**
- **Two wide intake ports to assure better distribution in combustion chamber.**
- **Two extra-large dual exhaust ports to clear out burned gas quickly.**
- **All castings made by costly die cast method.**

$24.95

Including spark plug and gas tank (without coil and condenser)

BORE	Special
STROKE	31/32"
DISPL.	7/8"
	.645
WEIGHT (inc. gas tank)	13 oz.

Designed by and manufactured under the supervision of the men who trained 25,000 Army flyers at the Thunderbird and Falcon Fields in Arizona.

SCOTT MOTORS, INC.

SKY HARBOR AIRPORT • P. O. Box 831 • PHOENIX, ARIZONA

DEALERS, ORDER NOW!

Write or wire your Christmas order for SUPERCHARGED THUNDERBIRDS without delay. All orders will be filled on a first come, first served basis.

Director, represented the A.M.A., and Mrs. J. W. Hillegas and Mrs. H. D. McCall the Cleveland Women's Chapter of the N.A.A. Any bona-fide model airplane club in this vicinity is eligible and welcome to join.

Omaha

Jack Fluehr of *Mid-States Model Aeronautical Assn.'s* Omaha branch informs us of his state's showing in the Nationals. Five out of ten prizes in the Class A Free Flight event were won by Omahans: 1. Herb Kothe, 2. Al Milana, 6. Jerry Bahula, 8. Jack Fluehr, 10. Jim Nicas.

Washington

Bill Williams, president of *Seattle Guideliners,* sent along complete results of the Washington State Free Flight Championships held on Aug. 4:

Class C Senior—1. B. Blanchfield, 2. Owen Brown, 3. Stan Engle.

Class B Senior—1. Lynn Johnson, 2. Hubert Estrop, 3. Kenny Burr.

Class A Senior—1. Al Dippert, 2. Marvin Stevens, 3. Rex Baumgardner.

Scale Event, Open—1. Jack Hewes, 2. Art Watkins, 3. Dick Nichol.

Canada

The *Canadian Gas Model Club's* annual Canadian National Model Airplane Meet at Toronto on Sept. 13 and 14 produced the following results:

Class A Junior—1. Brian Hockin, 2. John Easton, 3. Ralph Ball.

Class A Senior—1. Gordon Hockling, 2. Barry Brown, 3. Albert Pow.

Class B Junior—1. Raymond Waddell, 2. Brian Hockin, 3. Norm Carrol.

Class B Senior—1. Erwin Wallaker, 2. Cecil Woods, 3. William Cole.

Class C Junior—1. Brian Hockin, 2. Garry Ainsworth.

Class C Senior—1. Allan Ford, 2. Joe Poptipcoe, 3. Gordon Hockling.

A & B Speed Junior—1. Norm Carrol, 2. Brian Hockin, 3. Earl Ricketts.

A & B Speed Senior—1. Harold DeBolt, 2. G. K. Hawkshaw, 3. M. Watson.

Class C Speed Senior—1. Harold DeBolt, 2. R. Storick, 3. R. Wagner.

Towline and Rubber Events. Junior Stick—1. Ralph Ball, 2. John Easton, 3. Brian Hockin.

Senior Stick—1. Frank Loates, 2. Roy Thomason, 3. Ronald Meen.

Junior Fuselage—1. Brian Hockin, 2. Kenneth Kennedy, 3. Ralph Ball.

Senior Fuselage—1. Ronald Meen, 2. Bruce Lester, 3. Roy Thomason.

Junior Towline Glider—1. David Henshaw, 2. Brian Hockin

Senior Towline Glider—1. Jerry Tichopad, 2. Barry Brown.

South Africa

We received a "third quarter 1946" report from *Rand Model Aeronautic Club,* foundation member of the Amateur Technical Societies of South Africa. In August the club revised its contest rules extensively, to include additional amendments for free flight gas, rubber, glider and control line events. Instruction facilities have been provided at Milner Park, the World of Models building; however, the Johannesburg club is having difficulty finding suitable flying fields, a problem with which many American modelers are all too well acquainted. We note that meetings of the *Rand M.A.C.* are well attended; membership jumped from 50 in January to 139 as of an August accounting.

FREE FLIGHT BIPLANE

While most present day model builders spurn the biplane as an obsolete type, twin-wingers are capable of fine performance. In the January 1947 issue of Model Airplane News will appear the first of a two-part article on a Class C free flight biplane by Jack Luck, who says it is his favorite ship for sport flying.

MODEL AIRCRAFT *is Always* FIRST *with the* LATEST!

CONTROL MODELS

A J Whip Power-P39	$ 1.25
A J Fireball	10.00
Aero Puppet	5.95
Atomic	3.50
Baby Miss Behave	2.65
Baby Shark	2.95
Berkeley Controliner P-47	5.95
Bipe	3.95
Buzz	8.95
Cadet	5.45
Challenger	9.50
Custom Cruiser	10.00
Cyclone-Scientific	4.95
Dmeco Special	7.95
Dreamer	7.50
Ercoupe	12.50
Falcon Hawk P6E	8.95
Falcon Speedster	5.45
Falcon Sportster	5.45
Fokker D7	7.50
G-13	7.95
Hellhammer	7.95
Knight Twister	7.75
Miss Behave	3.95
Miss Behave Streamline	4.95
Mustang	4.95
Northrup P-61	12.50
PDQ	5.00
Skycycle	7.50
Sting Ray	4.75
Strato-Cat	5.95
Strato-Kitten	2.95
Super V Shark	4.95
Tarpon	10.75
Tether Sharpie	1.00
Tiger Shark	4.95
Topping 100	10.00
Vee Gee	10.00
Whizzer Standard Kit	7.50
Whizzer De Luxe Model Kit	9.95
Wren	6.95

WHAT TO BUILD IT WITH

X-Acto No. 83 Set	$ 5.00
X-Acto No. 84 Set	7.50
X-Acto No. 85 Set	12.50
X-Acto No. 62 Set	2.00
61 to 80 drill set in index case	3.50
Set of Swiss Type Files (12)	4.00
Set of 6 Screw Drivers	4.00
Chicago Handy Grinder	20.00
Chicago Handy Grinder De-Luxe Set	27.50
Burgess Vibro-Tool	7.50

PLASTIC PLANES

TBF-1 Avenger	$2.00
P-61 Black Widow	2.50
SB2A-1 Buccaneer	2.00
F4U-1 Corsair	2.00
B-17 Flying Fortress	5.00
A-20 Havoc	2.50
F6F Hellcat	$2.00
SB2C-1 Helldiver	2.25
A-26 Invader	2.50
B-24 Liberator	5.00
P-38 Lightning	2.00
P-51 Mustang	1.50
B-26 Marauder	4.00
B-25 Mitchell	3.00
L-4 Piper Grasshopper	3.50
C-54 Skymaster	8.00
C-47 Skytrain	6.75
B-29 Super Fortress	9.50
P-47 Thunderbolt	1.75
P-40 Warhawk	1.50

Base for Airplanes, 15c and 25c

Also METAL TANKS AND SHIPS. (Send for complete list)

CLEVELAND MASTER KITS

Stinson Reliant—82½" Radio control line kit	$15.00
B-17 Flying Fortress	14.50
B-25 Mitchell	9.50
B-26 Marauder	9.50
A-20 Havoc	8.50
P-51 Mustang	3.00
P-38 Lightning	4.00
Hellcat	3.50
Avenger	4.00

TOPPING "100" SPECIAL

All Metal U-Control

with Rogers Ram	$20.95
with Delong "30"	$29.50

(Delivered)

BOOK SPECIAL

"Fighting Wing" (256 pages)	$2.75
"Air Power" (U.S. Army Air Forces Illustrated)	$2.75
"Air News Year Book (Vol. 2)	$4.75

ALL THREE BOOKS FOR . . . $5.25

Regular $10.25 Value. Delivered to Your Door!

GAS MODEL ACCESSORIES

Aero Coils—Light Weight	$2.50
Quality	3.00
Aero Condensers	.25
Heavy Duty	.45
Alligator Clips	.12
Austin Timers	1.50
Battery Boxes—Pen-lite, intermediate and large	.40
High Tension Leads, sol. ends	.15
Ignition Wire, 5 feet	.15
Motor Mounts—Metal, A & B, 30c; C	.50
Power Plus Wet Cells	$2.75-3.50
Battery Charger	4.45
Burgess Batteries 3A2—Special for Race Cars & Boats	.60
Burgess Batteries 2Z2P1	.64
Burgess Batteries 2Z2SC	.50
Burgess Batteries 4F2H Booster	1.14
Adjustable Control Handle	.69
Megow Battery Case	.40
Slim Jim Case	.40
Spark Plugs V-V2-V3-VR1-VR2 Each	.50
Toggle Switches	.50
U-Reely Control	7.50
Braided Wire—72 & 90 lb. test, per foot	.05
U-Control Wire 100 feet	.50
140 feet	.75
Universal Flexible Needle Valve	1.25
Universal Needle Valve	.75
Wilco Coils $1.95; Economy	1.00

GAS PROPS

FOR U-CONTROL—HI-THRUST, 10" PITCH

8"-9"-10" .....45c 12"-13" 60c
11" .....50c 14" 65c
Snafu 7½—10"—75c

Flo-Torque—8" to 14", finished and hi-lacquered—50c

Class D—26" Reuhl Bakelite

Racing Hydroplane Kit $12.50

FOR FREE FLIGHT

FREE FLIGHT GAS KITS

Aero Champ—B	$ 2.50
Air Foiler	3.95
American Ace 36-A	1.50
American Ace 54	3.95
Banshee	6.95
Bay Ridge Roamer, A or B	2.95
Bay Ridge Mike B	2.00
Bee A	1.95
Brigadier B-58	2.95
Brooklyn Dodger	3.95
Buccaneer 48	3.50
Buccaneer A-36	1.50
Buccaneer B Special	3.95
Buccaneer C Special	6.95
Capitol Piper Cub Cruiser-C — Ideal for Radio Control	10.95
Coronet, A or B	2.50
Custom Cavalier	15.00
Interceptor (Comet)	3.95
Jersey Javelin, A or B	3.95
Jiffy A	1.50
Little Chief A	2.95
Mercury C, 6 ft. wing	5.50
Musketeer "54"	3.50
Pacer B	3.95
Pacer C	4.95
Piper Cub, B-52 ⅝"	6.95
Playboy, Jr., B	2.50
Playboy, Sr.	4.50
Ranger A or B	3.00
Runt A	2.50
Sailplane C	8.95
Spearhead, Jr., A or B	1.95
Stinson Reliant (Cleveland) — Ideal for Radio Control	15.00
Stratospear	2.95
Strato-Streak	2.50
Super Buccaneer	8.50
Vagabond C	5.50
Varsity B	3.50
Wanderer A and B	3.50
Wog, B—60"	5.50
Zipper A	1.95
Zipper—C	5.95
Zomby, A or B	3.00

SHIPYARD MODELS

VARNEY ELCO PT BOATS	$ 7.95
Varney submarine	5.00
Varney, L.S.T.	10.75
Rogers L.S.T. or Rogers L.C.I.	1.95

MARINE MODELS

Corvette	$12.00
Liberty Ship	7.50
Coast Guard Cutter "Subbuster"	8.00
Ship's Launch	5.50
Whale Boat	5.50
Sub-chaser	9.50
Coast Guard Cutter Atlanta	11.00
Cape Mendocino	20.00
P.T. 10	5.50
Tug	8.00
Fire Boat "Alert"	10.00

IDEAL MODELS

Submarine	$3.00
Cutty Sark	3.50
Bluenose	3.50
Sovereign of the Seas	3.50
Destroyer Preston	4.00
Coast Guard Cutter Campbell	4.00
Leddy Victory Cargo Ship	5.75
P.T.	3.50

POWER BOATS

Commando	$ 4.95
Marlin	7.50
U-Bo-Gee	10.00
U-Bo-Gee De Luxe	15.00

MEGOW

Destroyer Pillsbury	$6.00
Submarine S-51	4.95

MISCELLANEOUS BOAT KITS

Viking Flattie	$2.50
Sea Queen	1.50
Grand Banks	3.00
Sail King	2.00
Sea Demon	1.50

GAS ENGINES — PACKED WITH EXTRA POWER!

Arden	$19.50
Atwood Champion .60	23.50
Bantam .199	18.50
Barker .60	14.95
Blakely C .60	35.00
Bullet "27"	12.75
Cannon B .300	19.75
Contestor .60	28.50
De Long "30"	19.50
Dennymite Airstream .57	15.85
Fleetwind .60	24.75
Hornet .60	35.00
Hurricane .24	19.75
Ken .610	32.50
McCoy Super .60	35.00
McCoy Red Head (for planes)	35.00
Melcraft B .29	18.50
Merlin .24	18.00
Minijet	35.00
Mighty Midget "45"	24.95
Ohlsson .23	16.50
Ohlsson .60	18.50
OK Super .60	21.00
O. K. Twin	55.00
Pacemaker .59	24.95
Pierce "29"	21.50
Rocket .46	22.50
Rogers .29	15.75
Rogers Ram (class B)	10.95
Torpedo "29"	18.50
Vivell .35	18.00
Vivell .49	20.00
OK B .29	15.50

O.K. SUPER "60"

Less Coil and Condenser **$18.00**

SPECIAL!

DeLong .30 . $19.50

GLIDER DEPT.

Albatross	$3.50
Jasco Floater	2.00
Sail Wing	1.00
Super Sinbad	2.50
Thermic 50	1.00
Thermic 50X	1.00
Thermic 70	3.50
Thermic 72	3.50

RUBBER DEPT.

All American	$1.00
Flying Cloud	1.75
Gull (Comet)	1.25
Miss World's Fair	1.75

ARMORED DIVISION

Amphib. Jeep	$2.75
Rogers AA Gun	2.95
Searchlight	1.00
2½ ton Truck	1.00
Weasel	2.95

Plastic Craftsman Set	$2.00
DeLuxe Vibro-Tool Outfit	$16.50

Send For JUMBO CATALOG 20c

We're omitting pictures in this ad so that we can list more items for your selection!

CLEAR DOPE $3.30 GAL.

COLORED DOPE **$2.75 Per Gal.**

OLIVE DRAB—SEA BLUE—WHITE
(Any 4 gallons for $10.00)

BRUSHES—$1.45 Complete Set

Round to pin point—00	For super detail and striping
Flat—¼"	For small planes
Flat—½"	For medium planes
Flat—¾"	For large C ships

FREE POSTAGE on all orders of $3.50 or over. Add 10% to all orders under $3.50. We cannot ship C.O.D.'s and our minimum order is $1.00. Send check or money order for full amount of order.

MODEL *Aircraft*

EVERYTHING FOR THE MODEL BUILDER!

418 N. CHARLES ST. - BALTIMORE 1, MD.

World War I

(Continued from page 37)

Successful flights with the Rs.III in early 1917 proved again that Dornier was on the right track but he was not the type of man to be satisfied.

Rs. IV Background

He had felt for some time that there was much to be gained by the use of an all-metal stressed skin fuselage on his next flying giant, the Rs.IV, already on the drawing boards. To gain the knowledge he needed, Dornier digressed from the seagoing craft in the middle of 1917 to design and build the Dornier C.I, a conventional two place land biplane but featuring a fuselage made entirely of metal. The C.I was engineered to existing specifications for the type, but never intended to be put into production. Although it failed to meet certain performance figures laid down by the German airforce technical department, the C.I did provide Dornier with the all-metal fuselage technique he needed to go ahead with the Rs.IV project.

The final giant flying boat of the Rs. series was completed early in 1918. Rs.IV wingspan and area were the same as in the Rs.III, but the overall length was reduced to 73 ft. 7 in. And while it appeared generally similar to its immediate predecessor, the Rs.IV was a remarkably modern airplane and definitely showed the all-out efforts of Dornier's best thought and experience regarding the type. Empty weight was 15,400 lbs., gross weight 23,550 lbs. Wing loading was the same as the Rs.III, but power loading was reduced to 21.8 lbs. per hp. Available information on the Rs.IV structure is more complete than for any of the other Rs. types because the IV was surrendered to the Allies after the 1918 Armistice, and when revealed was regarded in awe by engineers the world over. What astounded Allied commissions was the ingenious use of steel and aluminum in the airplane's framework and the variety of machine formed members Dornier had evolved.

Wing structure, for instance, was a mixture of steel and aluminum. The three main spars were made entirely of steel and were triangular in crossection, arranged with an apex downward. Each spar consisted of three spanwise members with a semi-circular crossection to the open flanges of which was riveted a broad "U" shaped cap, thus forming a hollow tube. Three such tubes, located at the apices of the triangular spars, were interconnected by a series of riveted crosspieces to form a girder-like unit. Ribs were made entirely of aluminum alloy. The top and bottom contours were nearly closed box channels formed of sheet dural connected by a girder work of "U" channeled members riveted and gusseted in place. The extreme leading and trailing edges were rolled and formed respectively from thin dural stock to the required contours. Dural rivets were used to join the aluminum components, and steel rivets were employed for steel assemblies. Compression ribs were more heavily constructed. Their top and bottom caps were made of three pieces: a center beaded "U" section reinforced by a "J" section stiffener riveted to each chordwise flange. The numerous false ribs spaced between the full ribs were formed of very light gauge dural box section and extended as far back as the rear of the front spar.

(Turn to page 86)

Ribs in the two ailerons were identical to the tail sections of the normal wing ribs and had at the leading edge a dural tube spar. Trailing edge was formed as described for the wing, but a mid-chord auxiliary spar of thin sheet metal was incorporated for added strength. Two control horns attached to the tubular leading edge actuated the ailerons. A very small wing attached only to each pair of upper horns provided aerodynamic balances. Ailerons were hinged to a false or aileron spar within the wing.

The fabric wing covering was applied in a very ingenious manner. Because of the quite deep airfoil section in the Rs.IV, it was found impractical to sew the fabric to each rib as was the usual practice with smaller airplanes. Dornier therefore developed a special cement which was successful for the purpose but not as entirely satisfactory as the stitching method. Strips of fabric were attached to the ribs where the section was too deep to sew with a needle. Cement was then applied to the fabric strips and the wing covering applied so as to adhere to the cemented areas. Where the section was thin enough, fabric was sewn to the structure.

Wire bracing was again resorted to in the Rs.IV wing. Flying wires, two pair to each side ran from fittings on the undersurface of the wing to terminals on the hull. The innermost landing wires ran from the top of the fuselage to fittings on the upper wing surface. At that point, kingposts were provided to carry the outer bracing wires from the fuselage to a point near the wingtips.

The conventional Rs. IV empennage consisted of a stabilizer fixed to the fuselage, a one-piece undivided elevator, and an equally divided vertical tail assembly. Fins were attached to the fuselage above and below with a separate balanced rudder for each. Construction of the empennage members followed that pattern found in the wing except that aluminum alloys were used throughout. The two main stabilizer spars were of the box type made of two deep flanged channels riveted together. A lifting airfoil was employed in the horizontal tail plane.

Metal Float and Fuselage

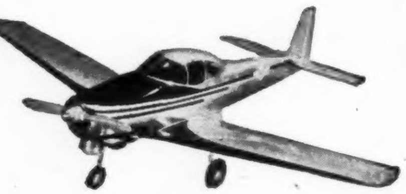
Main float of the Rs.IV represented a considerable advance over previous Dornier floats. The unit consisted of fourteen girder type bulkheads of mixed dural and steel construction to which was attached an outer covering of sheet dural. Half-round flanged channels of rolled dural were riveted lengthwise to the exterior to stiffen the structure. The flat bottom section forward of the three steps gradually became a "V" bottom near the stern. Each step was ported to ram air into the step, thus breaking the suction for quicker takeoff. Lateral stability when still or moving on the water was achieved by addition of sponsons to either side of the float and integral with it. This permitted a narrower beam on the float proper. Each sponson was provided with two steps.

A cockpit containing flight and engine controls was situated near the nose of the float. Dual wheel controls and rudder pedals, very much like their most modern counterparts, were provided for a pilot and co-pilot. A second cockpit, about the middle of the float, contained facilities for the two mechanics in the crew. Ten 300 liter fuel tanks were carried fore and aft of the mechanics' station, supplying fuel for a 10 hour flight. The individual tanks were made of sheet aluminum and were

(*Turn to page* 89)

NORTH **NAVION** AMERICAN

SCALE CONTROL LINE GAS MODEL



SCALE
1" = 1'

SPAN
33½"

ALL CLASS
MOTORS

$7.50

PLUS 30c
BY MAIL

WRITE FOR
FREE
CIRCULAR

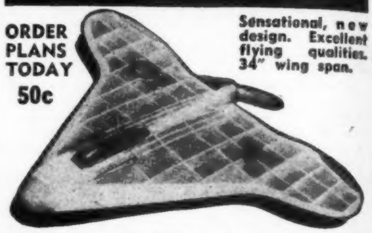
ZANDL
MODEL PRODUCTS
6832 47th AVE. N.E.
SEATTLE 5, WN.

DEALERS
JOBBERS
WRITE

CROSS FLYING WING

ORDER PLANS TODAY
50c

Sensational, new design. Excellent flying qualities. 34" wing span.



Build it! Fly it! Designed for rubber band. Can be converted for Class A gas engine, control line or jet propulsion. Results from 4 years' experiments with flying wings. Attracts attention everywhere. Requires only standard materials every model builder has. Complete, full size, easy to follow plans, 50c prepaid. Mailed promptly.

N. A. CROSS 1429 Vinewood DETROIT 16, MICH.

MELCRAFT

Super Charged ENGINE '29'

for flying pleasure

easy starting • consistent performance

At your dealer or write for descriptive literature

$18.50 with COIL and CONDENSER

PISTON DISPLACEMENT: .287

Jobber and Dealer Inquiries Invited

MEL Craft
SAGINAW, MICHIGAN

Book 3

6 PLAN BOOKS

BOOK 1
First Navy Trainer, Vought Fighter 1921, Famous Curtiss NC-4, Navy Schneider Cup Racer, Ford Trimotor

BOOK 2
Sikorsky ampb. S-39, Fokker D-7, Italian Sch. Cup Racer, Fairchild Sport 24, Curtiss F8C-4

BOOK 3
Richtofens Fokker Tripe, Curtiss Condor of 1930, Fk. Hawks Texaco 13, Aeronca C2 Sportplane, Boeing F4B-4

BOOK 4
Nieuport 17C1, Monocoupe Sport 1930, Lindys Lockheed Sirius, Supermarine Racer S6B, Vought 03U-2 Biplane

BOOK 5
Sopwith Snipe, Akron Airship Fighter, Byrds Fokker Trimotor, Howard Pete Racer, Waco Taperwing-1930

BOOK 6
Pfalz D-X11, Great Lakes Sportplane, Turners Racer 57, Spirit of St. Louis, Curtiss Hawk P5

Most of the plans are ¼ inch solid scale. Each book is illustrated with a famous plane on the cover and contains: 1. A W.W.1 plane. 2. A Famous Flight. 3. A racing plane. 4. A popular sport. 5. An army, navy or transport plane. (50c per book or a complete set of 6 books for $2.00.) Send us a list of plans you would like printed. More books are coming soon with your favorite plans!!!!! Dealers, write for discounts.

Write to JOHN O'SHAUGHNESSY, Dept. 8
℅ The Manhattan Modeler, P.O. Box 20
Hamilton Grange P.O., New York City, N.Y.

---

528 PAGES
205 DIAGRAMS & PLANS

"Model Airplane Design" *by* C. H. Grant

THE COMPLETE INSTRUCTOR ON MODEL FLYING!

Only $3.75 at your favorite model or book store . . . or order from publisher, Air Age Inc., 551-5th Ave., New York 17.

Wishing You
A MERRY CHRISTMAS *from*
CONTROLINE HEADQUARTERS

FREE BREAK-IN PROP—100' CONTROLINE WIRE WITH EACH MOTOR

MOTORS

Atwood Super Champ.	$23.50
McCoy	35.00
Hornet	35.00
Kopper King "60"	24.50
Bunch Contestor	28.50
Mighty Midget	24.50
Ohlsson 23s and 60s	23s 16.50
LIMITED	60s 18.50

AND ALL POPULAR MAKES

XMAS SPECIAL

Atwood Super Champ—Less C&C	$23.50
Curtis Hawk P-6E Controline Plane	8.95

including
Break-in Prop 12"
Control Handle
100' Controline

$32.45

ALL FOR ONLY $32.45 PP

NEW CONTROLINE PLANES

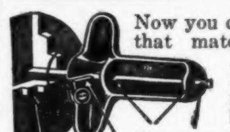
Capitol Beechcraft (B&C)	$ 9.95
Challenger (C)	9.50
Airmaster Aircar (C)	7.95
Curtis Hawk P-6E (C)	8.95
Snuffy Biplane (A&B)	3.95
Wren (A&B)	6.95
P.D.Q. (A-B)	5.00
Stunt King (B&C)	6.95
Snafu Plastic Zero (B&C)	9.95

WE STOCK EVERYTHING IN THIS MAGAZINE. ORDERS P.P. WITHIN U. S.

CONTROLINE HEADQUARTERS
DICK'S HOBBY SHOP
CHICAGO, ILLINOIS

2818 East 79th Street **Chicago 49, Illinois**

DOWEL TROUBLES?



Now you can make dowels that match your wood! Amazing new SPEE-DOWL makes perfect, burnished dowels for arrows, cabinet work or other projects. Simply rotate wood in lathe or drill press and push on SPEE-DOWL like pencil sharpener! Cast aluminum body, tool steel blade. A necessity for fine craftsmanship. Available in 2, 3, 4, 5, 6, 7, and 8/16" sizes. Only $1! Send check or M. O. now for your SPEE-DOWL. Special—any 4 sizes $3; complete set of 7 for $5. Unconditionally guaranteed. Free literature.

SPEE-DOWL
Dept. H-2, 34 Mall Dr., North Plainfield, New Jersey

removable for servicing or repair. The float interior was calked with sealer and painted with a bituminous, acid resisting protective coating.

Dornier was probably more proud of the Rs.IV fuselage than of any other element in the airplane. All-metal and with a reinforced stressed skin, it contained no internal bracing whatever. The Dornier C.I had certainly served its purpose! And considering the youth of the science of aviation, the newness of metal to aircraft and the more than 60 foot length of the Rs.IV fuselage, Dornier probably had reason to be proud. It was the largest structure of its kind made to that date.

An observation post complete with a revolving machine gun ring was located in the extreme nose of the fuselage. A small cabin immediately aft contained a command post and the plane's radio facilities, and a second gunner's cockpit was provided just above the trailing edge of the wing. Basic fuselage members comprised 30 bulkheads or formers, a majority of which were built up of "U" channels of dural. Three pairs of formers were employed at the junction points of the 4 fuselage sections and differed in that they were made of flanged channels reinforced with steel gussets. Fuselage skin was smooth metal sheet riveted to the various formers. External "longerons" were provided in the form of half-round flanged channels of riveted dural.

Power and Performance

Four 260 hp. *Maybach* engines arranged in tractor and pusher pairs powered the Rs.IV. The two nacelles containing the paired engines were supported from the hull by a series of streamlined struts made up of four pieces of power formed heavy gauge steel sheet. The engine mounts, following the general structural scheme, were girders built up of steel components riveted into rigid units. The smooth metal covered nacelles contained the oil supply in tanks mounted between the engines. An opening in the upper surface of each nacelle between the engines was provided for the mechanics to adjust the engines in flight. Conventional nose type radiators were fitted to the tractor engines while the rear engines were cooled by radiators mounted midway between wing and nacelles.

What potential the Rs.IV possessed in war service never will, of course, be known. The first World War was nearly over when the Rs.IV first flew in mid-1918, but the promise it demonstrated made up for all the headaches it must have caused Dornier during its design and construction. Flown from the surface of Lake Constance, about 1,500 feet above sea level, the Rs.IV had a top speed of 90 mph at that altitude. Because of the high power loading at that altitude the takeoff run was rather long, but in the air it was a good, serviceable airplane. Stable in all three axes, the Rs.IV was reasonably light on the controls and was capable of maintaining flight on three engines when fully loaded. In light condition, the plane could maintain a 3,000 ft. altitude with only two engine operative. Landing speed at the Lake Constance level was just 50 mph.

Although the Rs. IV was never used in military operations, it must be regarded as a milestone in the progress of aircraft design and construction. The lessons other engineers learned from Dornier's pioneering experiments were translated into better metal aircraft everywhere. In fact, many details and ideas carried out by Dornier nearly thirty years ago have found their way into modern aircraft.

Model Airplane Newsletter

(Continued from page 6)

Wichita on the eve of the meet after a three day mule journey from the wilds of Oklahoma. His model boxes were strapped to the critter and at last hearing the modeler and all his planes survived the trip in good condition.

For the first time—and to find out if the average contestant had any interest in such events—indoor autogiro, ornithopter and helicopter events were added to the regular schedule. Similar categories were established outdoors for rubber powered experimental models as well as for R.O.W. free flight gas jobs. This latter event attracted a lot of interest and spectator excitement. Ted Gillette of California walked off with first prize in the "dunkers" division and at the same time hung up a new hydro record.

Ed Lidgard of Chicago, chairman of A.M.A. Moffett committee, thought the indoor experimental categories might suffer from some of the contraptions that put in an appearance. But according to our own survey, a lot of chaps went home from the meet determined to try their hand at indoor models.

Considerable interest in indoor flying was reported, too, among members of the *Hy-Flyers* clubs of Wichita because of the opportunity members had to witness these fragile, almost-weightless indoor types in action.

From a public relations standpoint the meet could not have been better "covered." One national picture-news magazine devoted several pages to the competition directly afterwards, and the Associated Press wires carried the results each evening before the scores of the national semi-pro baseball tournament which was held in the same city at the same time! Even the staid "Wall Street Journal" carried a special story on the competition and the model business.

Two newsreel companies were in attendance and several national radio broadcasts were made. A number of newspapers sent special correspondents to "cover" the affair and report in detail on the performance of local boys entered in the Nationals.

From Los Angeles, Irwin Ohlsson and Harry Rice flew 15 winners of the Western States Open meet to compete in the Nationals.

A new wrinkle in contestant aids was the Micro-Bilt bus which was in attendance as a complete motor workshop on wheels dedicated to keeping all types of motors in running order. As a gratis service to harried flyers whose engines were battered or just wouldn't percolate, the workshop-on-wheels had a staff of skilled technicians who repaired all types of motors on the spot, compliments of M-B! Ray Arden, popular engine designer, had his two smallest motors on display. One is about the size of the end of a lead pencil. That's the big one! The other is much smaller—and both had considerable running time to their credit. Just to show that he's a lot older than he looks, Mr. Arden had a gas engine on display which he built back in 1908. Truly a small world.

Although the number of radio control models at the meet was small, interest in this type of flying was at fever pitch. Jim Walker, 1941 R.C. champ, took top honors again this year; but from the number of contestants who were comparing notes on transmitters, coils, by-pass condensers and so on it looks like the 1947 radio control competition will be a lulu.

Outstanding girl contestant was cute little 9 year old Skippy Pinckney of Elmhurst, Ill. Skippy is an expert control line fan and it was a sight to see her flying her models on a day when the wind was particularly strong. Big, brawny entrants from all parts of the country had been standing around most of the day refusing to fly because of the stiff breeze when up came Miss Pinckney and quite calmly went through the process of getting in her official flights in speed and stunt events. Oh, it's a (great big) man's world—it is!

Yes, it was quite a meet from start to finish. As Frank Zaic pointed out in an ad appearing in a special supplement of the Wichita *Beacon*, the trials and tribulations of the individual entrant in the meet are something that he or she will remember for a long time to come and will be recounted many times at local meets and bull sessions of the local club.

One of the most exciting phases of the meet and the associated sessions of the Academy of Model Aeronautics (meeting in its first convention since before the war) were the bids by various cities for the 1947 Nationals. After the shouting was over the choice seemed to narrow down to Akron, Ohio and Houston, Texas—both represented by special delegates—and Detroit, Michigan which made a bid by letter for the contest.

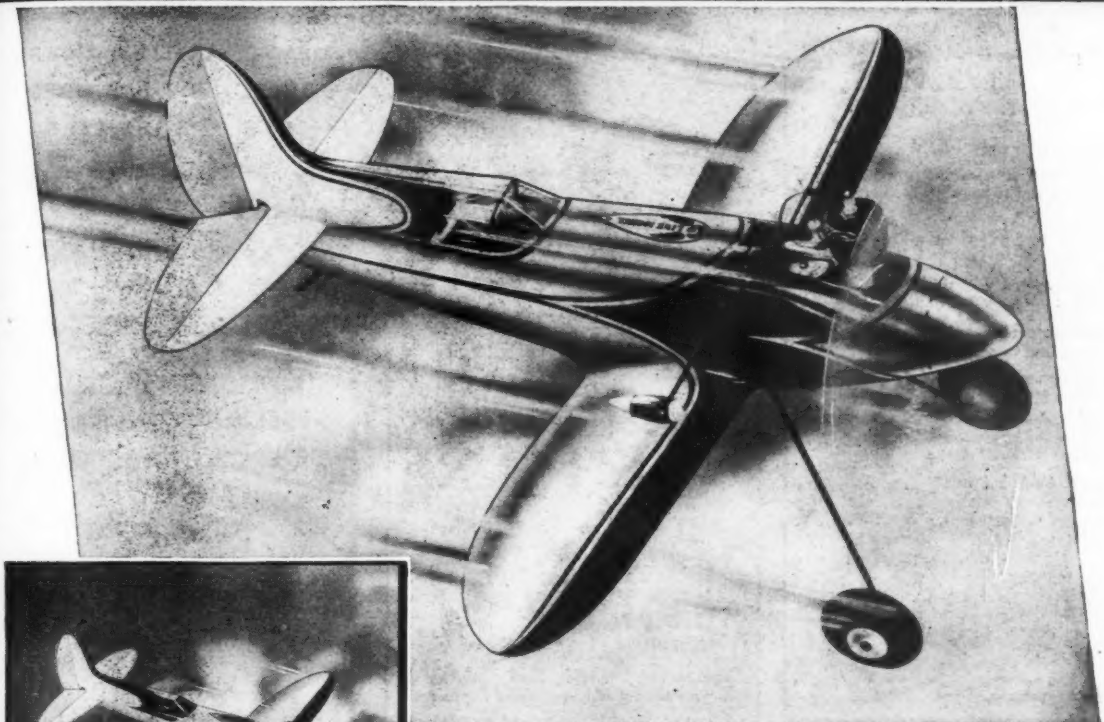
Right now no one knows just where the meet will be held, but you can rest assured that the announcement of location will be given in plenty of time.

However, regardless of where next year's competition is held, there will be no more hard work put forth on the meet than that shown by the good citizens of Wichita.

PHOTO CREDITS

Page	
2	*Upper*—The Waco Aircraft Co. *Lower*—Press Assoc.
23	*All*—Edo Aircraft Corp.
26	Pictures 1, 2, 3, 5—Ernie G. Petry Picture 4—Ohlsson & Rice, Inc. Picture 6—Wm. Bibichkow

RACY · RUGGED · and FULL of FLIGHT...
STANZEL *Super* "V" SHARK



Super-sturdy and super-speedy, the Super "V" Shark deserves its rating as the best speed-and-stunt model for Class "B" and "C" motors. The streamlined, G-line Super Shark hits a phenomenal 120 m.p.h. and features the new, improved Roller Control. Built of balsa, with hardwood and plywood reinforcing stress points, the model's durability is increased by an all-steel landing gear.

$4.95 PLUS 30c POSTAGE

THE BABY "V" SHARK

This remarkably perfect model is designed for Class "A" and "B" motors and is sturdily constructed of balsa, hardwood and plywood, with an all-steel landing gear. Boasting a 20-inch wingspread, speed in excess of 100 m.p.h. and championship performance, the Baby "V" Shark is an ideal G-line model for a beginner. **$2.95**

PLUS 25c POSTAGE

THE INTERCEPTOR

A gracefully streamlined Class "B" Free Flight Model of strong climbing qualities, the Interceptor has an unusually flat, lingering glide. Wing span — 52 inches . . . simple to construct . . . easy to fly.

$2.98

PLUS 30c POSTAGE

THE TIGER SHARK

Especially designed for Class "C" motors, this single line model is recommended to those not interested in elevator control. Unusually stable, with large wing area, the Tiger Shark performs perfectly in flight. Simple to construct . . . easy to fly.

$4.95

PLUS 30c POSTAGE

STANZEL MODEL CONSTRUCTION KITS

include everything needed . . . ample supplies of carefully selected balsa, plywood, hardwood, cement, dope, music wire, screws, etc. Also complete plans and instructions for building and flying. Your favorite model dealer features these kits.

100 FEET STEEL G-LINE 50c

VICTOR STANZEL and CO.

First in Control Line Flying

SCHULENBURG, TEXAS

West Coast Tips

(*Continued from page* 12)

with it. 119 miles per hour! Boy, that was really moving! They communicated this fact to Don who was working on his airplane.

"Yeah," said Don, with a disappointed look on his face, "I don't know what's the matter with this thing. I haven't hit any kind of speed at all since I've been back here." The two gentlemen looked at each other, gulped, and looked at their watches. No, they hadn't made a mistake, the watches still showed them that Don had just flown his speed job at 119 mph and here he was *disappointed* because the engine wasn't running right. Oh brother! Mr. Sullivan carefully wrapped up his watch, preparing to take it back to Philadelphia to show some chaps what's what; and Mr. Shulman, with a thoughtful look on his face, slowly walked away.

* *

Davie Slagle really showed the onlookers at the Nationals what could be done with an airplane on a wire. Davie did them all—balloon busting, square loops (inverted too, if you please), all kinds of upside down and inverted flying, including lazy eights and things that happened almost too fast for the mind and eye to grasp. Davie got his biggest hand, though, the night the awards were passed out. Somebody had a little diesel job, flying it in the auditorium. Matty Sullivan called Davie over and gave him the controls. As long as the motor was running, Davie gave a workmanlike job; however, when the motor quit Davie came to life and really did tricks with the plane, just whipping it around. This brought the house down.

At least 17 of the Western boys at the Nationals were Sweepstakes winners of the Western Open, and were flown to the meet by Ohlsson and Rice in their great silver C-47. Now if you ever wanted to see what modeler's heaven looked like, you should have seen the inside of that airplane with 23 people and, believe it or not, 170 model airplanes of all sizes, shapes and colors! That was a sight not likely ever again to be duplicated.

Harry Rice and Irwin Ohlsson are due a lot of thanks for showing the boys the kind of support that will go a long ways toward furthering model building as a national hobby.

* *

In addition to attending the Nationals, some of the boys brought home some good-sized hardware items worthy of note. Leading the parade and awarded the Berkeley trophy and watch as Novice Grand Champion was Frank A. "Pappy" Davis of San Diego, winner over Guy McClure of Oklahoma City in a protested decision in the Class C outdoor gas Free Flight Open.

Next of note was Ted Gillette of Hollywood, who set a new R.O.W. Free Flight Gas record. Incidentally, Los Angeles really cleaned up in the R.O.W. event, winning 1st, 2d, 3d and 7th with four entries. Davie Slagle won the Junior National Championship as well as the Jr. Class of Precision or stunt flying. Davie could easily have won Jr., Sr. and Open in the stunt event if not for his age.

Clarence Wallick of Long Beach finally won the Class C Control Line Open Event after losing his plane during a test hop. Wally really had tough luck because your reporter was timing him for a speed of 125 mph when his down wire broke. Wally could have saved his plane by putting it in the grass, but there were too many people around so he let it hit the concrete—and that was that.

Don Newberger won the Class B Control Line event in almost an afterthought. Don had just gotten his C job ready to fly when the "winds hit Wichita" so he had to fly at six o'clock that night. In the meantime, somebody had kicked his needle valve and broke it, and Don didn't have a spare. So Don said, "Oh, well, I might as well fly my B job." He did, once, and won the National Championship in that class.

Little David Wade won two events, Class B Free Flight Gas and Class C Free Flight Gas, both Jr. events, and were his parents proud of him when he got back to Los Angeles! Thaddeus Taft of Los Angeles, 14 year old Jr. entrant, won the Outdoor Rubber Stick Event in Jr. Class with a prodigious flight of over 18 minutes.

The *Oakland Cloud Dusters* did themselves proud too, cleaning up in several events. Bill Atwood of Burbank had himself a good day in the Indoor events, getting a 1st and 2d in cabin and stick.

Jim Walker of Portland won the radio control event and deserves a lot of credit for putting on a creditable performance, showing real skill considering that his airplane hadn't even been test flown before the meet.

While speaking of Jim Walker, here is a little story we just can't leave out. The boys who came back on the O & R airplane had no way of knowing whether or not they would be eligible to go to the Nationals before the Western Open, so none of them had previously sent in their entry blanks. When they showed up at the Wichita Forum to enter their ships they were faced with a late entry fee of $2.50. Many of the boys were traveling on limited purses and were going to be hard pressed to take care of their hotel bills and meals, so they were worried about the extra $2.50. When Jim Walker heard about this it took him about two seconds to fork over $50 and pay every one of the boys' late entry fees. We can't think of a nicer thing happening.

West Coast Tips

(*Continued from page 12*)

with it. 119 miles per hour! Boy, that was really moving! They communicated this fact to Don who was working on his airplane.

"Yeah," said Don, with a disappointed look on his face, "I don't know what's the matter with this thing. I haven't hit any kind of speed at all since I've been back here." The two gentlemen looked at each other, gulped, and looked at their watches. No, they hadn't made a mistake, the watches still showed them that Don had just flown his speed job at 119 mph and here he was *disappointed* because the engine wasn't running right. Oh brother! Mr. Sullivan carefully wrapped up his watch, preparing to take it back to Philadelphia to show some chaps what's what; and Mr. Shulman, with a thoughtful look on his face, slowly walked away.

* *

Davie Slagle really showed the onlookers at the Nationals what could be done with an airplane on a wire. Davie did them all—balloon busting, square loops (inverted too, if you please), all kinds of upside down and inverted flying, including lazy eights and things that happened almost too fast for the mind and eye to grasp. Davie got his biggest hand, though, the night the awards were passed out. Somebody had a little diesel job, flying it in the auditorium. Matty Sullivan called Davie over and gave him the controls. As long as the motor was running, Davie gave a workmanlike job; however, when the motor quit Davie came to life and really did tricks with the plane, just whipping it around. This brought the house down.

At least 17 of the Western boys at the Nationals were Sweepstakes winners of the Western Open, and were flown to the meet by Ohlsson and Rice in their great silver C-47. Now if you ever wanted to see what modeler's heaven looked like, you should have seen the inside of that airplane with 23 people and, believe it or not, 170 model airplanes of all sizes, shapes and colors! That was a sight not likely ever again to be duplicated.

Harry Rice and Irwin Ohlsson are due a lot of thanks for showing the boys the kind of support that will go a long ways toward furthering model building as a national hobby.

* *

In addition to attending the Nationals, some of the boys brought home some good-sized hardware items worthy of note. Leading the parade and awarded the Berkeley trophy and watch as Novice Grand Champion was Frank A. "Pappy" Davis of San Diego, winner over Guy McClure of Oklahoma City in a protested decision in the Class C outdoor gas Free Flight Open.

Next of note was Ted Gillette of Hollywood, who set a new R.O.W. Free Flight Gas record. Incidentally, Los Angeles really cleaned up in the R.O.W. event, winning 1st, 2d, 3d and 7th with four entries. Davie Slagle won the Junior National Championship as well as the Jr. Class of Precision or stunt flying. Davie could easily have won Jr., Sr. and Open in the stunt event if not for his age.

Clarence Wallick of Long Beach finally won the Class C Control Line Open Event after losing his plane during a test hop. Wally really had tough luck because your reporter was timing him for a speed of 125 mph when his down wire broke. Wally could have saved his plane by putting it in the grass, but there were too many people around so he let it hit the concrete—and that was that.

Don Newberger won the Class B Control Line event in almost an afterthought. Don had just gotten his C job ready to fly when the "winds hit Wichita" so he had to fly at six o'clock that night. In the meantime, somebody had kicked his needle valve and broke it, and Don didn't have a spare. So Don said, "Oh, well, I might as well fly my B job." He did, once, and won the National Championship in that class.

Little David Wade won two events, Class B Free Flight Gas and Class C Free Flight Gas, both Jr. events, and were his parents proud of him when he got back to Los Angeles! Thaddeus Taft of Los Angeles, 14 year old Jr. entrant, won the Outdoor Rubber Stick Event in Jr. Class with a prodigious flight of over 18 minutes.

The *Oakland Cloud Dusters* did themselves proud too, cleaning up in several events. Bill Atwood of Burbank had himself a good day in the Indoor events, getting a 1st and 2d in cabin and stick.

Jim Walker of Portland won the radio control event and deserves a lot of credit for putting on a creditable performance, showing real skill considering that his airplane hadn't even been test flown before the meet.

While speaking of Jim Walker, here is a little story we just can't leave out. The boys who came back on the O & R airplane had no way of knowing whether or not they would be eligible to go to the Nationals before the Western Open, so none of them had previously sent in their entry blanks. When they showed up at the Wichita Forum to enter their ships they were faced with a late entry fee of $2.50. Many of the boys were traveling on limited purses and were going to be hard pressed to take care of their hotel bills and meals, so they were worried about the extra $2.50. When Jim Walker heard about this it took him about two seconds to fork over $50 and pay every one of the boys' late entry fees. We can't think of a nicer thing happening.

EXTRA PROFIT
FOR HOBBYCRAFT STORES

Here are two sure ways to make extra profit in your hobby store or department!

1. Give your customers exactly what they want — Keep your stocks supplied from Auler's huge warehouse of 10,000 items.

2. Keep stocks fresh and investment down — Get fast delivery from Auler's. All merchandise from stock shipped in 24 hours.

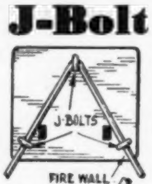
AULER TRADE MARK

H. F. AULER CO.
159 N. BROADWAY • MILWAUKEE 2, WIS.

JASCO SPECIALS

No matter what sort of rubber you are using these days, you need the items listed. They were designed to keep that wild surge and twist under control. You only have to try the SPECIALS once to appreciate their value.

J-Bolt



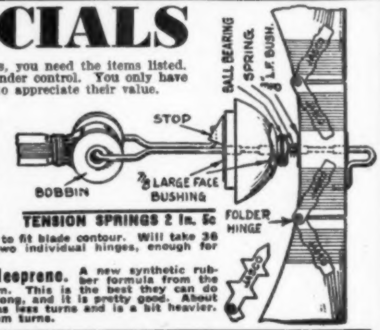
Can you imagine anything more simple. Bend landing gear, drill three or four 1/8th holes, insert J-Bs, tighten nuts and you are done. Set of 4 J-Bolts for 3/32" or 1/8" wire... 25c

BOBBINS 20 & 36 Str. Sizes.....5c each

B.B. WASHERS..........10c

Large FACE BUSHING 7/8" 3 for 5c; 3/8" 1c ea.

New Jasco Folder Hinges. Note its simplicity. Side lugs are bent down and forced into blade for positive and secure anchorage. Can be bent to fit blade contour. Will take 36 strands easy. Set contains two individual hinges, enough for one blader—10c per set.



TENSION SPRINGS 2 In. 5c

Special T-130 Rubber Neoprene. A new synthetic rubber formula from the makers of the original Brown. This is the best they can do until the real thing comes along, and it is pretty good. About same power as Brown but has less turns and is a bit heavier. TURN CHART shows maximum turns.

No. Str.	2	4	6	8	10	12	14	16	18	20	Wt. per Ft.
1/8th	80	50	39	33	29	27	25	23	21	20	.088 oz.
3/16th	60	39	32	27	24	21	19	17	15	14	.057 oz.

PRICE 1/8th flat 10 ft.........10c   Skein 210 ft.........$2.00   JASCO RUBBER LUBE
3/16th flat 10 ft.....15c   Skein 210 ft.........$3.00   1 oz.......17c 3 oz.......35c

Order from your dealer, or direct, Postpaid

SPECIAL SALE! Neoprene-Grey, can be used for testing rubber models for holding wings. 1/8 flat or equal. 3 ft.......................1c. Limited Stock.

JR. AERO. SUPP. CO. 203 E. 15th Street, N.Y.C. 3.

5 BOOKS TO DELIGHT EVERY MODELER AT Christmas!

MODEL AIRPLANE DESIGN

528 Pages **205 Diagrams and Plans**

"2 Great Books in 1"

1. Complete Instructor on Model Flying
This comprehensive book by *C. H. Grant* teaches ANYONE to produce consistently fine fliers. Excellent for either beginners or advanced.

2. Basic Trainer for Aviation
Flight fundamentals are thoroughly discussed. No other book affords better groundwork for aeronautics.

Complete $3.75 postpaid

FLYING SCALE MODELS

Complete plans, photos, instructions for building 16 flying scale military planes by America's top-flight designers.

104 large pages. $1.50

TWO WYLAM BOOKS

Prized collection of Masterplans by William Wylam, indisputable master draftsman of the model world.

Book I and Book II, $1.50 each.

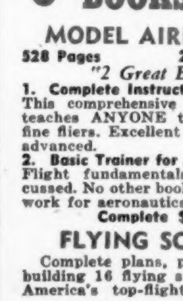
AIR AGE GAS MODELS

144 large pages. Complete plans, photos, instructions for building 21 gas models designed by America's champion modelers.

$2.00 postpaid

SPECIAL XMAS GROUP OFFER All 5 books in this model aeronautic library will be sent for only $9.00 postpaid—a saving of $1.25—to any address in the world!

COUPON



12-46

AIR AGE INC., 551 Fifth Ave., New York 17, N.Y.
Send postpaid a new edition copy of

( ) Wylam Book I..........$1.50
( ) Wylam Book II..........$1.50
( ) Flying Scale Models..........$1.50
( ) Air Age Gas Models..........$2.00
Model Airplane Design..........$3.75

☐ Send all 5 books for only $9.00 (saving of $1.25)

NAME..........

ADDRESS..........

CITY.......... STATE..........

Pre-formed Parts Make This SKYCYCLE Simple to Build and Fly!

Complete with Pivotal Control

36" Wing Span
27" Overall Length

$10 each

Nothing else like this on the market. Unmatched anywhere for value. Compare these features:

★ All-balsa planked wing and fuselage
★ No tissue covering
★ Ready-formed wire landing gear
★ Notched and tapered leading and trailing edges
★ Heavy plastic canopy completely formed and trimmed
★ Complete with all hardware
★ Nothing to cut out, every piece pre-shaped.

See it at your dealers or order direct today!

Wholesalers and Retailers Write:

MARYLAND HOBBY SUPPLY CO.
P. O. BOX 1661 BALTIMORE, MD.

PV-1

(Continued from page 29)

It also is made from 3/32" aircraft plywood; a yardstick, however, will make an excellent spar because the wood is unusually tough and stringy. Taper of the spars can be obtained from their locations on the ribs, which are shown on page 2 of the plans.

The rear spar is made of the same material as the front spar; note that it is not a full span spar, it runs out to Wing Sta. 8 9/16 only.

On the left hand side, holes are cut in the spars to provide clearance for the control mechanism. The spars are weakened by this but a 3/32" thick piece of plywood which is cemented between them and to which the bellcrank and horn attach, strengthens the wing in this critical area.

The root rib is in three parts: the forward, center and aft sections and all are made from ¼" thick hard balsa. Trace the outline of the root rib onto the side beams of the fuselage internal structure.

The tail booms are of white pine or spruce and the maximum crossectional size is 7/16" x 1". Cut and sand them to shape, and in the left hand boom put in the slot into which fits the control rod.

Bolt the engine mounts to the jig and assemble the front spar to the fuselage structure, pinning the spar to the jig at the tip. Aft of the spars and between the fuselage side beams are two pieces of white pine or basswood which are intended as spar splices. Cement the front spar splice to the spar and side beams, and when the cement has set attach the tail booms to the front spar and pin the aft ends to the jig.

The rear spar may now be assembled to the structure already in the jig. At the joint of rear spar to tail boom, cut a notch in the tail boom which is as deep as the rear spar at this point. If this notch is cut to the proper depth the rear spar will automatically line up relative to the rest of the wing. Add the root rib and cement the whole structure thoroughly, allowing it to dry completely before removing from the jig.

LANDING GEAR—The main landing gear is made of 3/32" diameter music wire and is bent as shown. The end is pierced into the tail boom and then the leg is securely bound to the tail boom with tinned wire and the wrapping is soldered to the music wire leg. This completes the landing gear for the time being.

The detail and installation of the nose gear is quite fully shown on page 1 of the plans. It has been made strong intentionally in order to absorb the shock of severe landings; in nine out of ten landings the nose gear struck first and thus took the full shock of the landing. It has held up very well.

FLIGHT CONTROLS—The bellcrank and control horn are made from .064" sheet aluminum from the details shown. The link and rod are made from .040" music wire; the ends are simply joggled and fitted in the corresponding holes in the horn and crank. The elevator horn is made from sheet tin and has a small channel soldered to it. The end of the elevator is square and fits into it, thus preventing any turning of the horn about the elevator itself. Install the controls as shown in the plans and check clearances carefully; be very sure the mechanism operates smoothly.

WING RIBS AND EDGES—The wing ribs are of 1/16" hard balsa and each left and right hand pair must be cut indi-

(Turn to page 98)

TUTHILL MODEL SUPPLY

DIVISION OF TUTHILL PHOTO SUPPLY

Tuthill — GENERAL HOBBIES — Hobbies with a Future

AIRPLANES · RACE CARS · SHIPS · RAIL ROADS
STAMPS AND COINS · PHOTOGRAPHY · SPORTING GOODS
DRAWING AND ART SUPPLIES

100 ATLANTA AVENUE, SHEFFIELD, ALABAMA

"Make Tuthill Your Hobby Headquarters"

FREE FLIGHT

Comet Zipper A	$ 1.95
Comet Zipper B	5.95
Brigadier 38	1.95
Air Foiler	3.95
Larkey	3.50
Mercury C	5.50
Varsity B	3.50
Baby Play Boy	1.00
Playboy B	2.95
Playboy Senior	4.95
American Ace (B-C)	3.95
Musketeer Std.	4.95
Custom Cavalier	15.00
Buccaneer B Special	3.95
Roamer A-B	2.95
Pacer B	3.95
Pacer C	4.95
Megow Piper Cub	6.95
Megow Ranger	3.00
Megow Zombie	3.00
Megow Aero Champ	2.50
Banshee	6.95
The Challenger	9.50
Spearhead Sr.	3.95
Skybo	6.95
Ace B-C	3.95
Yogi B	3.95
Flamingo	9.95
Wog	5.50
Strato-streak	2.50
Comet Interceptor	3.95
Topper A-B	3.50

Add 25c for Packing & Post.

U-CONTROL

Short Snorter	$ 2.95
Aero Puppet	5.95
Controliner	5.95
Scientific Cyclone	4.95
Whizzer	9.95
Falcon—All models	5.45
Miss Behave	3.95
Tiger Shark	4.95
Baby Miss Behave	2.65
Aero Puppet	5.95
Buzz	8.95
Duraplane	12.50
G-13	7.95
Baby V Shark	2.95
Super Shark	4.95
Sharpie	1.00
Teather Shark	3.50
Ercoupe	12.50
A-J Fireball	10.00
P.D.Q.	5.00
Eagle Scale Liner	4.95
Piper Skycycle	7.50
Strato-Trainer	3.95
Swift	7.50
Falcon Curtiss Hawk	8.95
Flicker	3.95
Megow Stardust	10.00
Eight Ball	6.95
Whirlwind	7.50
Beechcraft	9.95
Demco Special	7.95
Knight Twister	7.00
Wasp or Hornet	7.50
Ameco Trainer B-C	3.95

Add 25c for Packing & Post.

SOLIDS

Hot Shot Race Car	$ .50
Cavacraft Race Car	.60
Railway Express Truck	8.95
Hot Shot Race Car	.60
Farm Wagon	3.50
Stage Coach Kit	4.95
Covered Wagon	3.50
Cavacraft SE-5	.50
Strombeck-Becker	.25 up
Cavacraft P-51	.50
Swing Control P-38 & P-40	1.75
Falcon	.50 up
Ray Ring	1.00
Testor	1.00 up
Leddy Amphibian	2.50
Leddy Jeep	1.90
Cavacraft Piper Cub	.50

Add 15c for Packing & Post.

RUBBER POWERED

Cleveland	$1.00 up
Megow	.25 up
Scientific	.35 up
Comet	.25 up
Green Hornet	.50
Kaydet	.25
Shooting Star, Ryan Fireball, Globe Swift, Stinson	1.00
Capitol	.65 up
Berkeley	1.25 up
Eagle 4-1 Series	1.00
Modelcraft	.25 up
Flying Cloud	1.50

Add 15c for Packing & Post.

GLIDERS

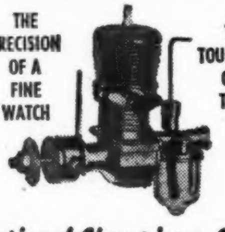
Berkeley Sinbad	$1.25
Megow	.15
Eagle "Nifty"	.25
Cleveland	.50 up
Scientific	.25 up
A-J Interceptor	.50
Gremlin	.25
Comet Skylark	.50 up
Jasco	.20 up

Add 15c for Packing & Post.

BANTAM for '46

America's Finest Miniature Motor

THE PRECISION OF A FINE WATCH

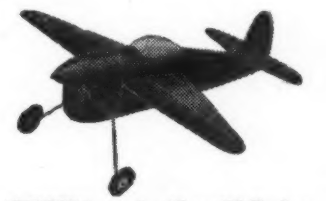


THE TOUGHNESS OF A TANK

National Champion • Class A

$18.50 less coil and condenser

add 25c for packing & post



ATOMIC! for Class 'B' Engines
New Low Price $3.50 Each

A control line model that is easy to build, fly and control . . . an outstanding contender for Class 'B' honors. Also Scientific Cyclone at $4.95 each; superb for 'B' or 'C' engines. Add 25c for packing and postage.

SCIENTIFIC ZEPHYR $1 Each

A honey with wingspan of 42". As easy to look at as it is to build. One of the best rubber-powered jobs. Also Scientific Olympic at $1 each; both 42" wingspan. Add 25c for packing and postage.

A Real Power House
The New **ARDEN**

Standard $19.50
Ball bearing $22.50

This baby packs the power! One of the newest motors. Precision machining and your choice of the standard or ball bearing model make this motor a giant among the midgets. Get an Arden and get ahead of the crowd.

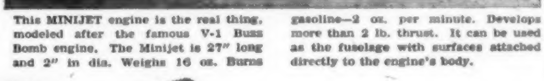
Arden P-099	$19.50
Arden B-099	22.50
Arden Power Unit	26.50
Arden Power Unit (less engine)	9.00
Arden Booster Jack	1.50
Arden Flight Timer	1.50

Make This Christmas a "MODEL" Xmas with everything you need from TUTHILL'S

A Real **JET** *Engine!*

$35.00

Add 25c for Packing & Post.



This MINIJET engine is the real thing, modeled after the famous V-1 Buzz Bomb engine. The Minijet is 27" long and 2" in dia. Weighs 16 oz. Burns gasoline—2 oz. per minute. Develops more than 2 lb. thrust. It can be used as the fuselage with surfaces attached directly to the engine's body.

54" Wingspan!

Comet Zipper 'B.' $5.95

An all-balsa model for "B" engines. An excellent free-flight performer. 54" wingspan. Add 25c for postage.

SPARTAN $1.00

42" Wingspan!

Rubber Powered—Easy To Build

Add 25c for packing and post.

ENGINES

McCoy	$35.00
OK Twin	49.00
Cannon B 300	19.75
Cannon C	21.50
Rocket C	22.50
Ok Super 60	18.00
DeLong B	24.50
OK 29	15.50
Fleetwind	24.75
Viking 65	26.50
Contestor D60-S	24.50
Contestor D60-R	26.50
Rogers 29	15.75
Super Champ	23.50
Pacemaker	24.95
Rogers Ram	10.95
Air-O-Mighty	24.95
Hornet	35.00
Minijet	35.00
Bullet	12.75

Add 25c for Packing & Post.
No C. O. D.'s on engines

ACCESSORIES

Power-Plus Batteries	$2.75 up
Power-Plus Battery Chargers	4.45
Prop Extension Shaft	2.00
Steel Wire, 100 ft. spool	1.00
Plastic Props 10"	.75
Plastic Props 12"	.90
Flo-Torque Props 9-14"	.50
Universal Needle Valve	.75
Power-Plus Coil	2.75
Power Plus Minicell	2.25
Power Plus Charger	1.95
Smith Competitor	1.95
Smith Firecracker	2.75
Flexshaft Needle Valve	1.25
Tail Wheels, Alum. Centers, 7/8"—10c; 1 1/4"—15c; 1 3/8"	.20
Snafu Treaded Wheels 1 7/8"—40c; 2 3/8"	.50
High Tension Leads	.20
U-Reely Control	7.50
75' Rubber	1.00
Hotcha Coil	2.50
Adjusta-Handle	1.00
H-A Rubber Wheels 2" pr., .40; 2 1/2" pr., .50; 3" pr.	.60
Metal Motor Mounts, Class B	.30
Metal Motor Mounts, Large	.45
Battery Boxes, A and B	.40
Red-I-Mix, 1/2 pint	.30
Red-I-Mix, 1 pint	.50
Silkspan, G. M., 3 for	.25
Tissue, R. P., 6 for	.25
Exhaust Stacks, Ohlsson & Bantam	.35
Berryloid Dopes and Thinners	.15 up
A-C Timers	1.50
Perrycraft Acc.	2.00
Davis Acc.	1.50
Burgess Booster	1.05
Burgess Flight B	.64
Burgess Flight C	.79
Vitamite Bat	2.35
Wheel Collar Hubs Set (4)	.25
Flywheels—A	1.00
B	1.75
C	2.00
Champion Spark Plugs	.50
2" Sponge Rub. Wheels pr.	.40
Areo Coil	2.50
Areo Coil, Super	3.00
Flexible U-Control Cable—100'	2.50
140'	3.50
Neoprene Tubing 1 foot	.35
Alligator Clips...2 for	.15
From Gas Tank	.50 up
From Spinners	1.00 up
Burgess Vibro Tool Kit	16.50
Rite Pitch Prop	.50 up
Super Screw Prop	.50 up
Steel Motor Mounts B	.50
C	.60
Spinit Starters	4.00
Brushes	.10 up
X-Cell Props, 9", 10", 11"	.75
Tether Control Hinges	.25
Condenser	.50
Hook-up Wire, 10'	.50
12 Solderless Lugs	.25

Add 15c for packing and post.

BOATS

Varney PT	$7.95
Monogram	1.00
All-Star	1.50 up
Rogers: War Wagons, etc.	1.95
Berkeley Sea Bird	7.90
Marine	5.00 up
Duralyt	9.95
Monogram Fleet	3.95
Varney Sub	5.00
Reuhl	12.50

Add 25c for Packing & Post.

CAMERA SUPPLIES

Ansco Paper & Film (color, black & white)	
Ansco Cameras	$ 3.00 up
Argus, Argoflex	54.80
Argus Telescope	95.50
Argus C-3	65.98
G. E. Meter	23.75
Argus Argoflex	65.63
Argus A-2	28.45
Federal Enlarger	33.75
Weston Meter	29.75
Argus Projector	27.75
Ciro-Flex	73.64

HOBBIESTS: If the particular model or accessories, camera supplies or drawing equipment is not listed here, write us your needs, or see our nearest dealer. You'll get prompt attention from Tuthill's . . . the house of friendly service.

DEALERS: Large or small, whatever the size of your order, we shall be glad to supply you. Orders will receive immediate attention. You will be allowed the usual discounts. Show rooms open daily, except Wednesday afternoons. Dealers invited.

vidually from details on the plans. The leading and trailing edges are also of hard balsa. Pin leading and trailing edges to the root rib and the jig at the tip; assemble the wing ribs to the structure with cement and pins and allow to dry thoroughly. The wing tip is solid balsa and need not be round as shown in the plans. If square tips are pleasing to your eye by all means put them on.

CONTROL WIRES—The control wires pass through two pieces of 1/16" O.D. aluminum tubing which are pushed through holes in the wing ribs and leading edge. The aft tube emerges from the bottom surface of the wing at Sta. 15 9/16. The wires themselves are .010" music wire and must be securely attached to the control horn. Allow about 10" on the outside for attaching the main control wires.

FUSELAGE FORMERS AND PLANKING—The upper fuselage half is completely removable from the shelf between the side beams and skin. The formers may be made in one piece and then out apart; the bottom parts are cemented permanently to the internal structure. The removable portions are also cemented on but only lightly since they must eventually be cut off.

All formers are made of 1/16" thick hard balsa except the one at Sta. 1 which is ⅛" thick.

At some time, either now or before assembling the formers, all the ignition wires and the condenser and coil should be put in. A location for booster plugs is shown and the installation will depend on the type being used. The ignition switch is mounted on the nose gear support. The battery box is shown in detail in the plans and no further explanation seems necessary at this time. Check all the ignition components to make sure that current is flowing through before going on to the rest of the structure.

After the formers have been assembled, add all the stringers; these are of 1/16" square hard balsa.

The fuselage may now be planked completely except for the engine cowling. The planks are ⅛" x 3/16" medium balsa and should be sanded down to a thickness of 1/16". After sanding, cut out the holes for nose gear and cockpit. Build the cockpit framework out of hard balsa or bamboo and use plenty of glue in its assembly.

The fuselage nose block is solid balsa and is sanded to shape after being firmly cemented on to the lower fixed portion of the fuselage. Drill two ⅛" diameter holes through the block and into the former aft of it. Insert dowel pins into these holes, and besides serving as pins to hold on the cowling they may be made to look like .50 cal. machine guns or 20 mm. cannon

The wing is planked in the same manner as the fuselage except that 1/16" x 4" sheet balsa is used. Begin planking at the trailing edge and work forward.

EMPENNAGE—The horizontal stabilizer and elevator are cut out of one piece of 3/16" thick hard balsa. Cut out the elevator area and trim off approximately ⅛" from leading edge of the elevator. Replace this with a piece of ⅛" square white pine or basswood and fit the elevator horn to this. Cement generously.

The hinges are small strips of starched muslin which criss-cross from top to bottom and bottom to top.

The horizontal tail surfaces may now be assembled to the tail booms with brads and ample cement.

The vertical surfaces are also made of 3/16" thick balsa and the hinges are

(*Turn to page* 100)

pieces of tin or brass; they are imbedded into the stabilizer and rudder. These provide a movable semi-permanent rudder and are ideal for the purpose. The left hand rudder has an opening cut into it to enable the elevator horn to swing freely. The opening may be covered with celluloid after painting. The vertical surfaces are split at the horizontal surface and are cemented to it. On each lower forward part of the vertical surface are wire reinforcements to serve as tail skids. These also prevent the propeller from coming into contact with terra firma.

After connecting the control rod to the elevator horn, fair the tail booms with balsa strips and sand down to the shapes shown on the plans.

This completes the major part of the structure and the model has at last begun to look like an airplane.

POWERPLANT—On most engines it will be necessary to remove the gas tank and to build a new one similar to the one detailed in these plans. The rear spar passes through the engine compartment exactly where most gas tanks are located, making it necessary to use a special tank. The tank is mounted forward of the firewall as shown.

The type of engine also determines to a large extent just what shape cowling must be used. In the prototype the bottom sides were made of soft balsa and were removable. Small celluloid tabs were cemented to the top which were then screwed to the engine mount. Pins in the bottom served to locate the cowling and to keep it from vibrating loose. On some installations this cowling could be fixed.

It will be found necessary to provide slots for the timer arm and for the exhaust stack. Note that the bottom fuselage planking ends at the firewall and that the engine cylinder will protrude in this area.

The air intake is a paper scoop on the bottom, shown in the views at Fus. Stas. 7 13/16, 9 5/8 and 11. It merely guarantees that air will get into the engine compartment and it is not connected to the carburetor airscoop of the engine.

The top cowling is hollowed out of one piece of soft balsa. It is attached with a machine screw through the top, screwing into a strap bracket fastened to the engine mounting bolts. This bracket may be made from sheet tin or brass with a nut soldered to it.

If it is not possible to obtain a commercial spinner it will be necessary to make one from white pine or basswood. It should be turned out on a wood lathe and hollowed out to clear the prop shaft, washer and nut. Attach with dress snaps, one half of which are soldered to a disk that fits between the prop and the cam washer on the prop shaft. A piece of aluminum tubing, the I.D. of which is large enough to fit over the propeller shaft, is pressed into the spinner to center it about the centerline of thrust.

Dummy scoops may be added to the cowling wherever it is seen fit to do so. This is all detail and it is usually worth the trouble for looks but it does not make the model fly any faster, so use your own judgment.

Assemble the engine, cowling and spinner and check the fit all over. Remember that on this airplane if any cowling comes loose in flight, it flies back into the propeller.

FINISH—Spray or brush on three coats of lacquer and sand between coats. Do not use dope on the unfinished balsa; it may warp badly. The prototype was

(*Turn to page 103*)

THE FIRST MAJOR ADVANCE
IN AIRPLANE DOPE...
IN TWENTY YEARS!
AERO GLOSS
Aero Gloss
VICTOR
FOR BUILDERS OF MODEL AIRPLANES • RACERS • BOATS
If you are a progressive, scientific minded model builder, here is a message to you! Aero Gloss dope has been developed by the finest research scientists in the industry to give you: (a) protection and safety . . . for Aero Gloss is FIRE RESISTANT, (b) serviceability and long life . . . for Aero Gloss is HOPPED UP FUEL PROOF, (c) beauty and pride . . . in its RICH, HIGH GLOSS FINISH. These revolutionary characteristics alone make Aero Gloss one of the outstanding contributions of the year to the model industry. Aero Gloss is truly a miracle dope for it is tough, strong, light weight, fast drying . . . . . has excellent tautening properties, better film building, fewer coats . . . leaves no brush marks, and reduces air drag. These are facts too compelling to take lightly. Finish your new airplane or spray over your old one with Aero Gloss, and you will find that AERO GLOSS DOPE is habit forming.
VICTOR AEROSEARCH
1707-09 N. KENMORE AVENUE
LOS ANGELES 27, CALIFORNIA
Aero Gloss

painted a dull olive drab on top and sides and a dull neutral gray underneath. Silver or aluminum may also be used and they will be appropriate. All the late model fighting planes are natural aluminum finish.

Insignia may be either painted on or decals used. Add whatever your personal wishes dictate. Incidentally, a red nose indicates an experimental ship. The landing gear dummy doors should be added for realism and the aforementioned dowel pin machine guns should also be dressed up to look deadly. How about adding triple rocket tubes under each wing?

FINAL ASSEMBLY—Add swivels to the control wire leads and check the elevator for free movement. In case access is required to any area inside the fuselage or wing, cut out a portion of the planking with a sharp razor blade. After inspection the plug may be cemented back in place and it will look just like an inspection door.

Well, there is not much else that we can do except to wish you a lot of luck and many happy flights with this model. It will be one that you will be proud to have in your collection. Good luck!

Spunky

(*Continued from page 21*)

the blades with tissue. Apply three coats of red dope and two coats of clear lacquer over this, sanding between each coat to get that glasslike finish. Remember, a plane's thrust is proportional to the efficiency of its propeller, so act accordingly.

COVERING—Before covering the ship, sand all the parts thoroughly. Notch the fuselage formers to prevent their sticking to the covering and producing a bumpy surface between the stringers. A smoother covering is also obtained if the builder will install the celluloid windshield before papering.

Little need be said of the covering procedure as it has been gone over time and time again. The original was covered with red AA tissue. Dope the ship with three coats clear dope, sanding lightly between each coat. Use well worn sandpaper for this operation so as not to puncture or tear the covering.

ASSEMBLY—Glue the stabilizer and rudder into their respective positions as illustrated in the plans.

Spunky is powered by a 12 strand motor of 1/4" flat brown rubber, 23" in length.

FLYING—On some calm day, presuming you have a well lubricated motor and a warp-free ship, take her out for her maiden voyage. Since no two ships perform identically, exercise great care in its first flights. The original had 1/16" downthrust and the same amount of right rudder.

Spunky has a fast steep climb in large right circles, and a slow shallow glide in tight right circles.

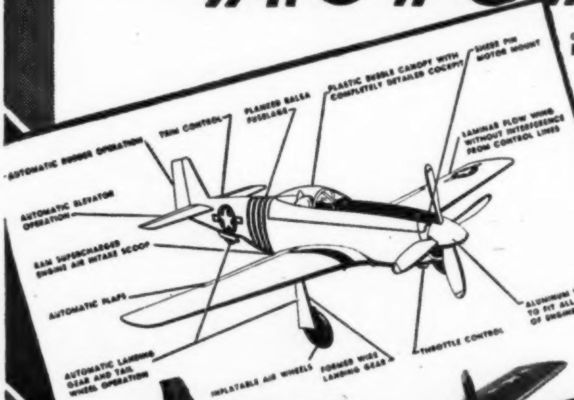
LIST OF MATERIALS

4 oz. clear nitrate dope
1 oz. clear lacquer
1 oz. red dope
2 sheets of red AA tissue (24" x 36")
6 strips of hard balsa (1/8" x 1/8" x 36")
4 strips of hard balsa (1/16" x 1/8" x 36")
1 sheet of medium hard balsa (1/32" x 1" x 36")
1 sheet of medium hard balsa (1/8" x 3" x 36")
1 sheet of hard balsa (1/16" x 3" x 36")
1 prop block of soft balsa (1-1/2" x 2" x 11")
1 spinner block of soft balsa (1-1/2" cube)
1 piece of plywood (1/16" x 1-1/2" x 4")
1 strip of .034 brass (1/2" x 2")
1 length of .043 steel wire 8" in length
1 length of 1/16" steel wire 8" in length

Berkeley OPENS ANOTHER NEW CHAPTER IN MODEL HISTORY

with new AUTOTROL

""AUTOTROL" and "CONTROLINER" are registered trademarks of BERKELEY MODELS, INC. All kits are manufactured under Bill Effinger's patents and patents pending.



"CONTROLINERS"

Since 1933, BERKELEY has pioneered many new developments in model aviation. Now, BERKELEY, first in gas models, — first in radio control, — presents AUTOTROL, amazing single line controlled gas models. Models that are interesting to construct and are easy to handle in the air. Every flight is a deft, precise and exciting performance. Buy, try, AUTOTROL — and judge for yourself.

SAFETY . . . "AUTOTROL" lines have only a few pounds tension at all times. Damage due to line breakage is negligible. SPEED — AUTOTROL gives you a speedy, thrilling performance every flight. Automatically compensates for wind and gusts. Reacts faster than the human brain. Model can be trimmed for maximum speed and be constantly held in that attitude. Simulates real automatic pilot control.

North American P-51 MUSTANG "CONTROLINER"

For Precision Flying — 37" Wingspan — with Three-line Autotrol for .19 to .30 Displacement Engines

The first and last word in controlled gas models. Here you have the model for precision flying . . . you operate trim tabs, landing gear, throttle and flaps while in flight. Features . . . automatic elevator operation—automatic rudder operation—trim control—throttle control—automatic landing gear and tail wheel operation—ram supercharged engine—laminar flow wing without interference from control lines—plastic bubble canopy with completely detailed cockpit—aluminum spinner to fit all makes of engines—inflatable air wheels—automatic flap operation—formed wire landing gear—planked balsa fuselage—sheer pin motor mount.

Complete Kit (Less engine, propeller and colored dopes) **$7.95**

The BUG FOR SPEED CONTROLINER

17½" Wingspan with 1 line Autotrol for .099 to .19 engines

Flashes through the air like a lightning bug. Easy to build and fun to fly. Get the BUG for gas model flying pleasure. Features: Pre-formed all balsa laminar flow type wing—formed landing gear—streamlined rubber wheels.

Complete Kit (Less engine, propeller and colored dopes) **$2.95**

The BAT CONTROLINER FOR SPEED

32" Wingspan with 1 or 2 line Autotrol for .49 to .65 engines

For upright or inverted engine installation. A smooth flying job that really gives a fast performance in the air. Pilot the speediest job in the show. Buy . . . Build . . . Fly . . . the BAT!

Features: Laminar flow type wing without interference from control lines — simple plywood and balsa fuselage construction — sheer pin motor mount — aluminum spinner—fits all make engines — formed landing gear — streamlined solid rubber wheels — elevator trim control. (Less engine, propeller and colored dopes) Complete Kit **$4.95**

AT BETTER DEALERS EVERYWHERE

BERKELEY MODELS INC.
140 GREENPOINT AVE. • BROOKLYN 22, N. Y.

he MOST EXACT
nd COMPLETE
uILD-UP SCALE
MODEL
ever produced!

The PIPER Skycycle

Designed by Ed Lidgard

ular
ngle-seat
portster

30" wingspan

$3.95
KIT Q-1

COMET
TRIUMPH!

Extreme accuracy to scale

Simple to construct—highly detailed—fully illustrated plans

Everything needed to build the model is supplied—including beautiful, clear plastic canopy

All parts to build a fully detailed engine

Shock-absorbing, formed landing gear with turned balsa wheels; solid rubber tail wheel

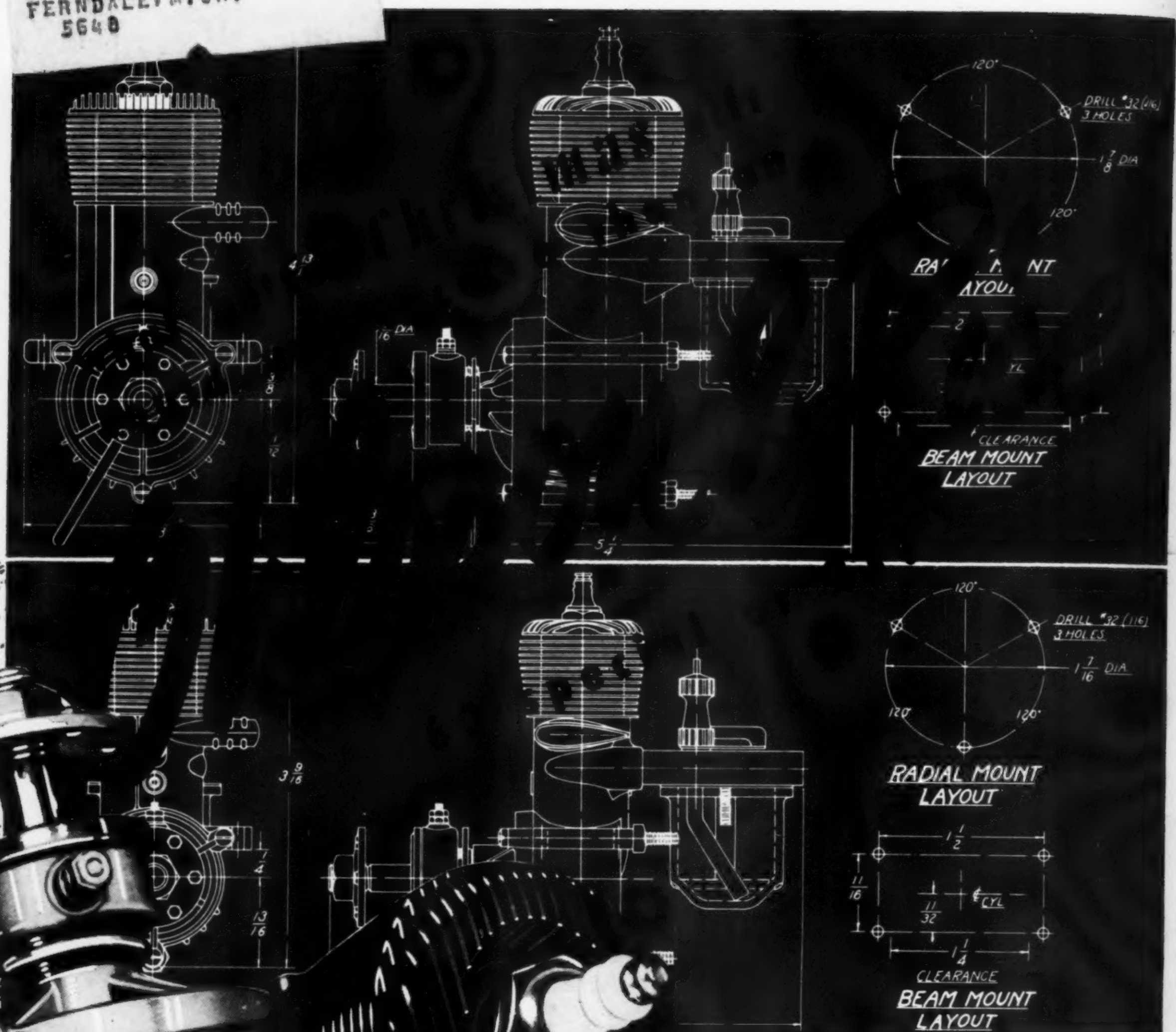
Completely detailed cockpit with upholstery, safety belt, rubber coaming, true scale instrument panel and brake pedals

- Large decal sheet with all necessary INSIGNIA and markings; dope and cement
- Plastic spinner
- Carefully designed fillet and cowling patterns
- Controls movable from cockpit
- Most wire parts furnished formed—other hardware furnished
- Designed with all the care and conscientiousness of a natural winner

DEALERS: Fill in and Mail this Coupon
ase put my name on your mailing list for latest information on new models, dealer helps, etc.

COMET MODEL AIRPLANE & SUPPLY CO. inc.
129 W. 29th STREET, CHICAGO 16, ILL.

TWENEY, GEORGE H.
1405 W. SARATOGA AV.
FERNDALE, MICH.
5648



O & R 60 Special
$18.50

O & R 23
$16.50

If you'd see a shiny new O & R 23 or 60 w[ith] your name on the tag . . . hanging on the Christmas [tree] on That Morning . . . it'd sort of make your eyes bug [out], wouldn't it? Well, start the word going round am[ong] your relatives. Drop a gentle hint like "Gee, if I'd [only] get an Ohlsson & Rice Engine for Christmas!" The[y'll] get the idea, all right. • And while you're at it, [tell] them, too, that if your model dealer doesn't happen [to] have an O & R in stock right now . . . they can just [put] a deposit on one. Then you'll be sure to have it w[hen] flying weather rolls round again. And remember: *In choosing an Ohlsson & Rice you will be getting the world's favorite model engine.*

Lapped piston and cylinder for microsealed compression
•
One piece microbalanced crankshaft
•
Ball bearing thrust bearing
•
Flutter-free timer — fully enclosed

Ohlsson & Rice

Standard of the Model World